DOGFIGHT

Spitfire I

Phoney War and Battle of France

Tony Holmes

DOGFIGHT 13

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CHAPTER 1
IN BATTLE

Although clearly acknowledged to be the best fighter then in service with the Royal Air Force (RAF), the Spitfire I had seen little in the way of real action during the many months of the Phoney War and the first ten days of the *Blitzkrieg* in the West following the German invasion of the Low Countries on 10 May 1940. This all changed with the retreat of the British Expeditionary Force (BEF) and the French army across Belgium and northern France in the direction of Calais and Dunkirk.

On 21 May, RAF Fighter Command was called upon to defend Allied troops massing on the Channel coast, and that day 142 British fighters flew 14 patrols, covering Allied warships and intercepting formations of German bombers which initially lacked any fighter escort. Spitfire I-equipped No 74 Sqn was in the thick of the action on the 21st, making eight claims in total for the loss of a Spitfire whose pilot was forced to land on the beach at Berck-sur-Mer when his aircraft exhausted its fuel.

Forty-eight hours later, Kiwi Plt Off Al Deere of No 54 Sqn claimed his first victories during an aerial engagement that would earn him and squadronmate Plt Off Johnny Allen a commendation from Air Vice-Marshal Keith Park, Air Officer Commanding (AOC) No 11 Group. Deere and Allen had escorted their flight commander, Flt Lt James Leathart, who was at the controls of No 54 Sqn's Master I trainer, across the Channel to Calais-Marck airfield to rescue the commanding officer (CO) of No 74 Sqn, Sqn Ldr Frank White. He had been forced down after the radiator in his Spitfire was holed by return fire from an Hs 126 reconnaissance aircraft during a dawn patrol.

Deere recounted the action in his autobiography, *Nine Lives*:

> May 23rd was destined to be the beginning of the shooting war so far as No 54 Sqn was concerned, myself in particular. We did our usual patrol at dawn – the squadron's 12th for the week just ended – and returned once again with guns unfired. No 74 Sqn had followed us on patrol, and it was they that drew first blood. When their section returned to land [at Hornchurch, in Essex], it was

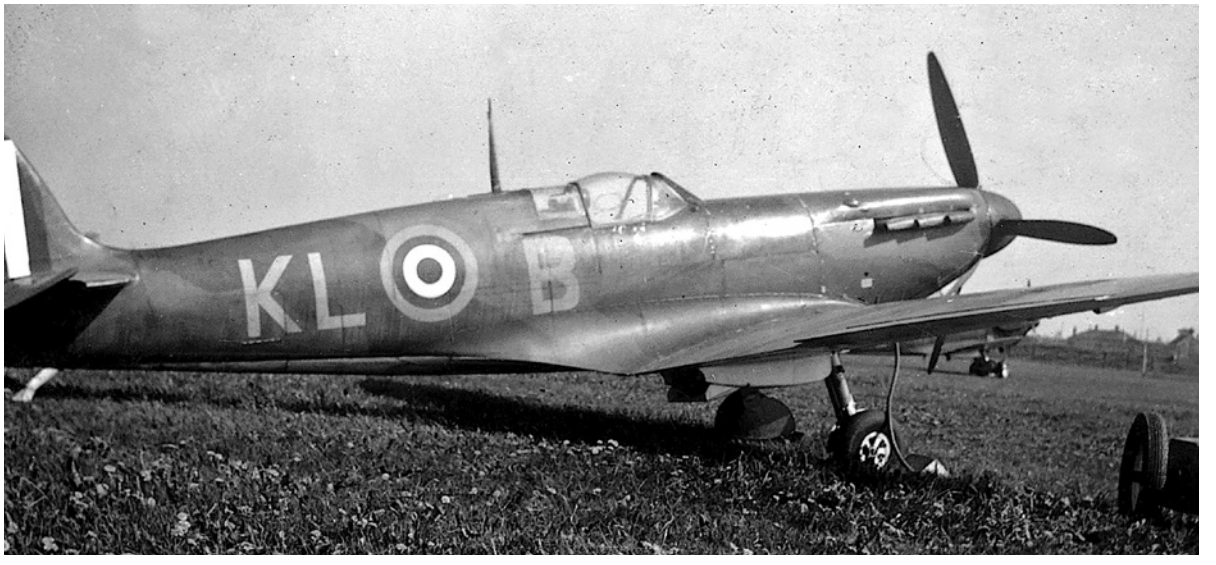
Al Deere, seen here whilst commanding No 602 Sqn in the summer of 1941, was the first RAF pilot to fight the Bf 109 in an extended aerial engagement. This notable action took place overhead Calais-Marck airfield, on the coast of northern France, during a one-off rescue mission on 23 May 1940. (Author's Collection)

noticeable that the leading edges of the wings of many of the aircraft were black with burnt cordite, denoting that the guns had been fired.

I then took myself off to the mess for a long-delayed breakfast, prior to going on readiness at nine o'clock. While breakfasting, I was called to the telephone to speak to 'Prof' Leathart, the flight commander.

'Al', he said, 'will you collect Johnny Allen and get here right away for immediate take-off. The Station Commander has suggested to Group that we fly the Master over to Calais-Marck to pick up the CO of No 74 Sqn. The AOC has agreed, and we have been given the job. I'll fly the Master and you and Johnny can act as escort in a couple of Spitfires. I understand that there is a lot of enemy activity over there now, and I think we stand more chance of getting away with it if just the three of us go. We can nip across at sea level, and should avoid being spotted by Hun fighters as the airfield is right on the coast.'

The plan was for the Master to land at Calais-Marck, pick up the squadron commander, if he was still on the airfield, and takeoff again immediately without stopping the engine. Johnny and I were to remain orbiting the airfield to protect the Master whilst landing and taking off. It sounded like a piece of cake. The trip out was uneventful and the Master landed without incident. There was broken cloud over the area, which meant there was a likelihood of being surprised from above. I decided, therefore, to send Johnny above the cloud, at about 8,000ft, while I remained below circling the airfield. I watched the Master taxi towards a small hangar, and was wondering if his passenger was about when an excited yell from the usually placid Johnny pierced my eardrums.



Plt Off Al Deere was at the controls of this aircraft, N3180, when he took on Bf 109s of 1./JG 1's whilst escorting No 54 Sqn's Master I, flown by Flt Lt James Leathart. It was one of 22 improved Spitfire Is supplied to the Hornchurch-based unit in December 1939, the aircraft featuring Rotol RX5/1 three-bladed constant-speed aluminium/magnesium alloy propellers and TR 1133 VHF radios. (Wingleader Collection)

'Al, they're here. Huns, about a dozen just below me and making towards the airfield. I'm going in to have a go at them.'

'Okay Johnny, for God's sake keep me informed. I must remain in sight of the airfield to try and warn "Prof" and stop him taking off.'

To warn the Master was not going to be easy. It carried no R/T [radio transmitter], and at best I could dive down towards where it stood on the airfield and waggle my wings, hoping that 'Prof' would interpret this as a danger signal. With these thoughts in mind, I wheeled my Spitfire around, only to see the Master taxiing out for take-off. At the very moment I turned, a Messerschmitt 109 came hurtling through the clouds straight for the defenceless Master, which, by now, was just becoming airborne. By the grace of God, the Hun flew right across my line of flight, and I was able to give him a quick burst of fire, which I knew had little hope of hitting him, but which, I hoped, would divert his attention from the Master. It did, but not before a stream of tracer spouted from his guns and disappeared, it seemed, into the fuselage of the trainer. By this time my throttle was fully open, and with the stick hard back to turn inside the Me 109, I was in range to fire.

Just as I did so, I heard Johnny screaming on the R/T.

'Red One – I'm surrounded. Can you help me?'

'Try and hang on, Johnny, till I kill this bastard in front of me, and I'll be right up.'

In a last desperate attempt to avoid my fire, the Hun pilot straightened from his turn and pulled vertically upwards, thus writing his own death warrant. He presented me with a perfect no-deflection shot from dead below, and I made no mistake. Smoke began to pour from his engine as the aircraft, now at the top of its climb, heeled slowly over in an uncontrolled stall and plunged vertically into the water's edge from about 3,000ft. Immediately, I broke back towards the airfield, thankful to observe the Master parked safely by the perimeter fence apparently unharmed. Now to help Johnny.

'Hello, Red Two, how goes it?', I called over the R/T. 'I'm coming up now.'

Flt Lt Leathart used Master I N7681 to rescue No 74 Sqn's downed CO, Sqn Ldr Frank White, the two-seat trainer being similar in appearance to this aircraft. Most operational units had single examples of training aircraft for liaison duties – Tiger Moths and Magisters were also used in this role. (Author's Collection)

Zooming up through the cloud, I found myself crossing paths with two Me 109s which were diving inland. They must have seen me at the same moment, because immediately the leader went into a steep turn. Again, I found no difficulty in keeping inside the turn, and was soon in range to fire. A long burst at the number two caused bits to fly off his aircraft, which rolled on to its back and careered earthwards. Whether or not he was *hors de combat* I couldn't be sure, but the leader was still there and had to be dealt with.

Reversing his turn very skilfully, he too dived towards the ground. Momentarily, I lost distance, but I had got in range again before he flattened out above the tree tops and headed homewards. A quick burst caused him to whip into another turn, and from this point onwards he did everything possible to shake me off. After a second burst I ran out of ammunition, but I was determined to stay behind him for as long as possible, if for no other reason than the fact that I didn't know quite how to break off the engagement. I had the feeling that he must have known I was out of ammunition, and was just waiting for me to turn for home. Fortunately for me, his next manoeuvre was to straighten out and determinedly head eastwards, at which point I pulled hard back on the stick and looped through the broken cloud before rolling out and diving full throttle towards the coast.

I now called Johnny on the R/T, and was relieved to hear his cheerful but somewhat breathless voice answer.

'I'm just crossing out north of Calais but am rather worried about my aircraft. I can't see any holes but felt hits, and she doesn't seem to be flying quite right. I'll make for North Foreland [on the Kent coast] at my present height of 8,000ft. See if you can join up.'

We managed to join up mid-Channel, and sure enough, his aircraft had been holed. However, it didn't seem too bad, and on my advice he decided to continue back to Hornchurch rather than land forward at Manston [in Kent]. He accomplished a safe landing to the accompaniment of a victory roll from me.

Excited pilots and groundcrew clustered around us on the ground and our stories had to be recounted in detail. Johnny's only comment was that he hoped the

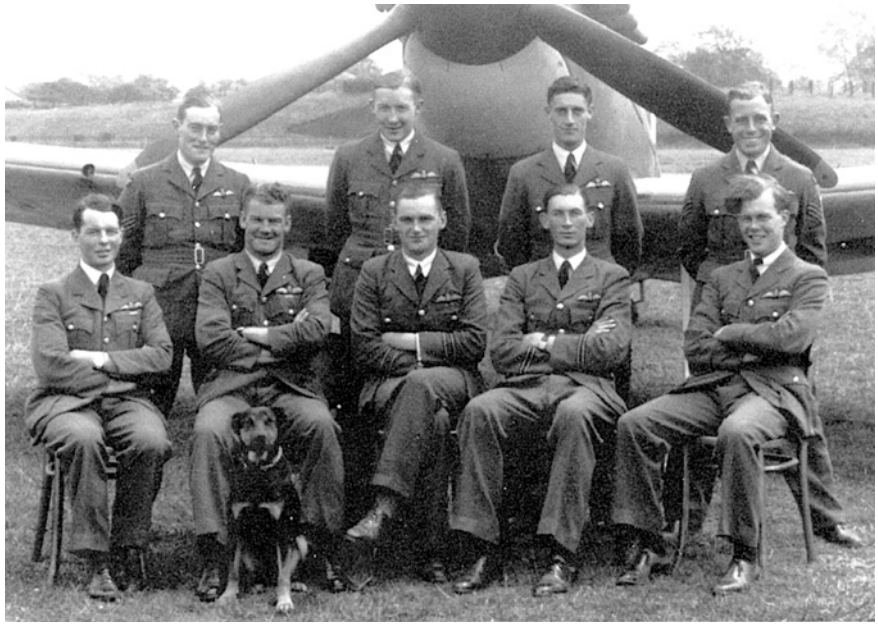
next time he encountered the Huns there would be fewer of them, and he would not be alone; after all, odds of 20-to-1 and 12-to-1 in consecutive engagements were too much for one's nerves.

Shortly afterwards, 'Prof' arrived in the Master with his passenger, both none the worse for wear. From the safety of a ditch, into which he had dived on scrambling out of his aircraft, he observed the air battle and was able to give his account of the affray. His story is best related by quoting verbatim from the official intelligence report he later made:

'The moment I left the ground I saw from the activities of Red One that something was amiss. Almost at once a Me 109 appeared ahead of me and commenced firing. I pulled around in a tight turn, observing as I did the Messerschmitt shoot past me. I literally banged the aircraft on the ground and evacuated the cockpit with all possible speed, diving into the safety of a ditch which ran along the airfield perimeter. Just as I did so I saw a Me 109 come hurtling out of the clouds to crash with a tremendous explosion a few hundred yards away. Almost simultaneously, another Me 109 exploded when it hit the sea to my left.

'From the comparative safety of the ditch, my passenger and I caught momentary glimpses of the dogfight as first a Me 109 and then a Spitfire came hurtling through the cloud banks, only to scream upwards again. It was all over in a matter of about ten minutes, but not before we observed a third enemy aircraft crash in flames. We waited for about ten minutes after the fight ended, and when it seemed safe made a hasty take-off and rather frightened trip back to England and safety.'

According to the No 54 Sqn combat report compiled by Intelligence Officer Flg Off Patrick Shallard following this engagement with Bf 109Es from 1./JG 1, 'Enemy offensive tactics were to outnumber the Spitfires by two-to-one on every attack – adopting line astern – so that evasive measures of the Spitfire could be followed. There was no "squadron" or "section" formation apart from



No 54 Sqn's Operation *Dynamo* survivors pose for a group photograph in front of Flt Lt Al Deere's Spitfire I at Rochford in late June 1940. The key players in the Calais-Marck rescue are visible here, namely Plt Off Johnny Allen (front row far left), Flt Lt Deere (sitting next to Allen) and Sqn Ldr James Leathart (sitting in the centre of the front row). Earlier that month, all three aviators had received decorations from HM King George VI for their bravery on 23 May. (Author's Collection)

this. The enemy aircraft appeared to hold their fire until they were well placed. Evasive measures were to dive steeply, pulling out suddenly, going vertically upwards and pushing the stick forward. Half-rolls from all positions and stall turns (particularly to the left) were used.'

This daring rescue mission marked the start of an incredible run of success for the trio of No 54 Sqn pilots involved in the action, with Allen, Deere and Leathart having been credited with 25 victories between them by 17 June 1940.

1100 hrs, 23 MAY 1940

CALAIS-MARCK

1 Two Spitfire Is of No 54 Sqn escort the unit's Master I from Hornchurch to Calais-Marck airfield, on the coast of northern France, in order to rescue the CO of No 74 Sqn.

2 Plt Off Al Deere orders his wingman, Plt Off Johnny Allen, to climb through cloud up to 8,000ft and patrol overhead while he escorts the unarmed Master down to land. As the Master taxis to a halt, Allen excitedly reports spotting more than 12 Bf 109Es from 1./JG 1 approaching the airfield.

3 As the Master has no radio, Deere is forced to dive down at the aircraft waggling his wing in the hope that its pilot, Flt Lt 'Prof' Leathart, sees him and remains on the ground. Whilst banking sharply around over the airfield perimeter, Deere sees a Bf 109E burst through the cloud cover and open fire on the helpless trainer as it becomes airborne. In an attempt to put the German pilot off his aim, Deere also opens fire and the Bf 109E veers away in a sharp turn.

4 With Allen screaming over the radio for help, Deere cuts inside the steeply turning Messerschmitt, forcing its pilot to straighten and then pull abruptly up into a climb. Deere has no difficulty following his foe, hammering the climbing fighter until it belches smoke and slowly heels over in an uncontrolled stall from 3,000ft. The Bf 109E then plunges vertically onto a beach below.

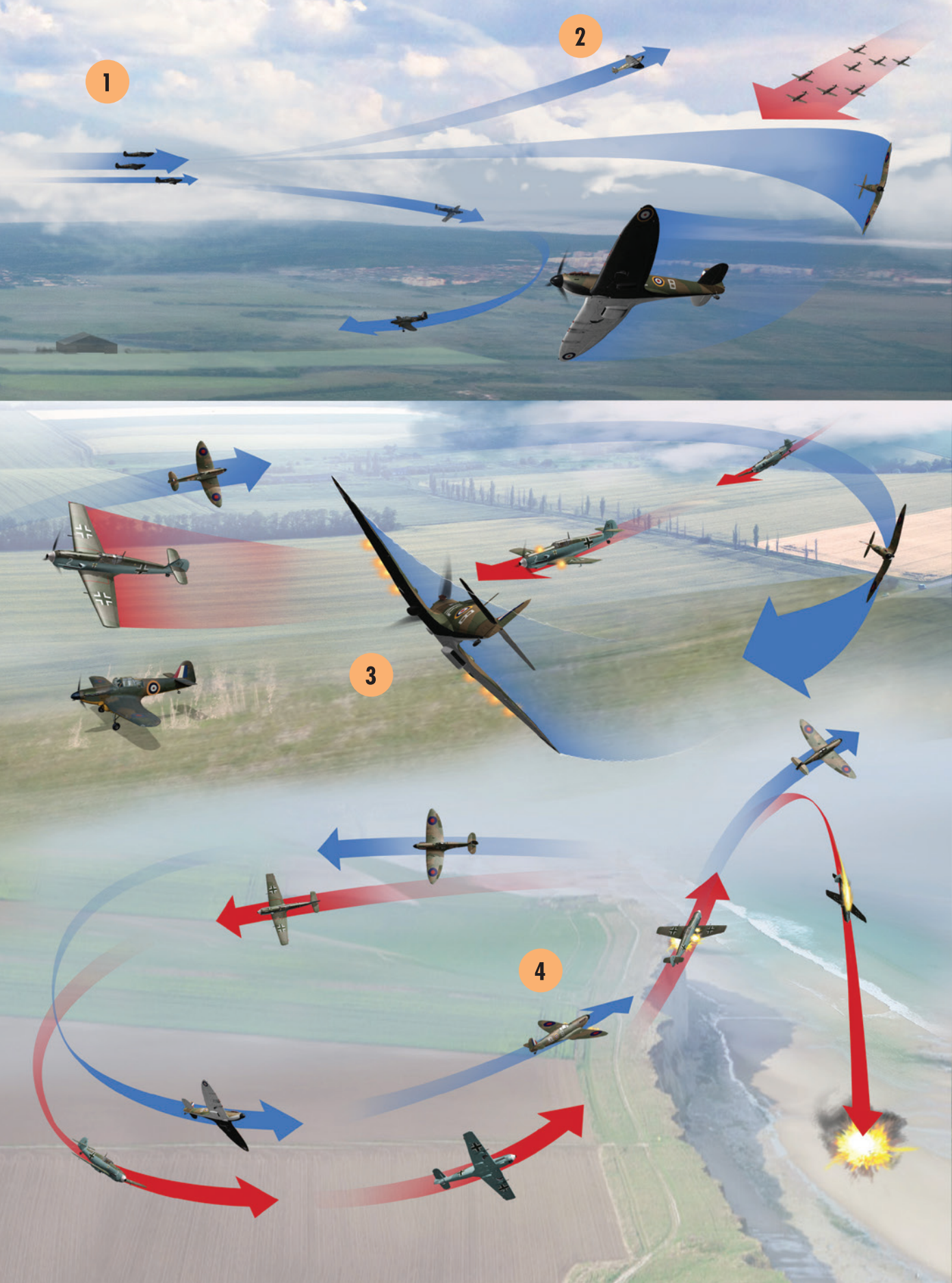
5 Leaving the first Messerschmitt burning below him, Deere zoom climbs as fast as he can up through the clouds to help the heavily outnumbered Allen. Emerging from the undercast, he immediately spots two Bf 109Es diving towards the airfield. Seeing the Spitfire, the lead German pilot enters a steep defensive turn, with his wingman tucked in close behind him.

6 Thanks to his fighter being fitted with a Rotol RX5/1 three-bladed constant-speed propeller, Deere is soon able to turn inside the trailing Bf 109E and fire a long burst at it. The aircraft loses parts, rolls onto its back and falls away.

7 Deere now turns his attention to the lead Messerschmitt, whose pilot keeps on turning before trying to escape by diving for the ground in an effort to leave the Spitfire behind. Deere closes the distance again as the enemy fighter flattens out above the treetops, the pilot frantically turning in an effort to shake off his pursuer.

8 After one more burst at his foe, Deere runs out of ammunition but is forced to stay in contact, fearful that the German will realise that he is now defenceless. Fortunately, the Bf 109E suddenly breaks away, intent on escape, and Deere pulls up through broken cloud and heads for home.

FOLLOWING PAGES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CHAPTER 2

SETTING THE SCENE

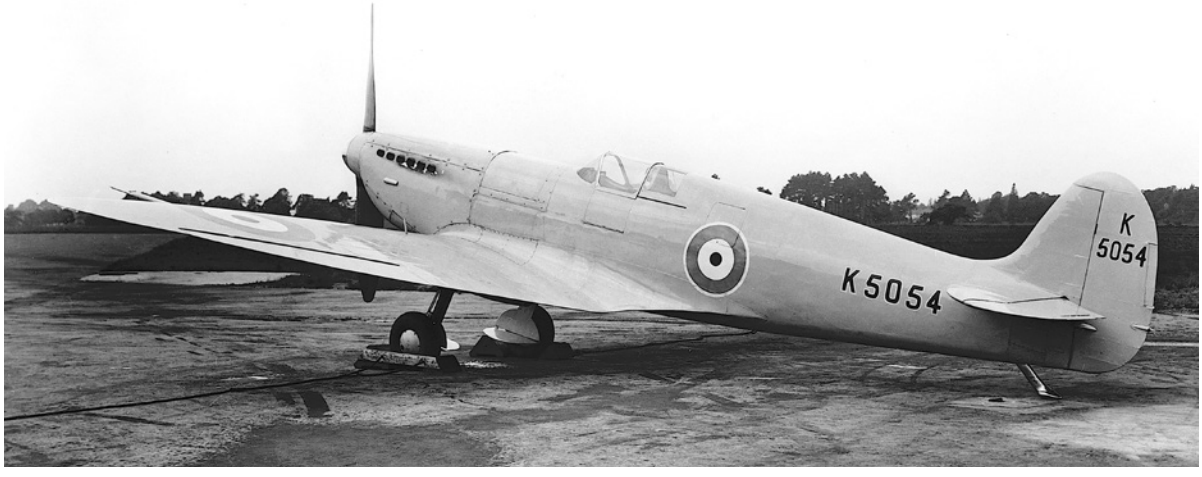
The Spitfire can trace its ancestry back to Air Ministry Specification F.7/30, which was issued in the autumn of 1931 shortly after Air Vice-Marshal Hugh Dowding – the future commander-in-chief of RAF Fighter Command – had been given responsibility for advancing the development of Britain's air defence equipment. The new specification called for a fighter that could achieve a higher top speed (225mph) than the Bristol Bulldog, which had entered service with the RAF in May 1929. It was to be fitted with four 0.303-in. machine guns, which was double the armament of the biplane fighters then in squadron service.

Military orders were scarce for the struggling British aviation industry when this specification was issued, and no fewer than eight manufacturers produced prototypes in response to F.7/30. The Air Ministry's insistence that the winning design had to be capable of performing both as a day and night fighter (thus replacing all other frontline fighter types) ensured that the successful tender would receive a large production order.

Amongst the companies hoping to secure the F.7/30 contract was Vickers Supermarine of Woolston, Southampton. Although it had little experience of building fighter aircraft, the firm had been heavily involved in high-performance aviation through its family of flying boat and floatplane racers of the 1920s and early 1930s. The company, and its chief designer, Reginald J Mitchell, had initially achieved prominence internationally when the Sea Lion biplane won the Schneider Trophy in 1922. It would secure further racing successes over the next nine years, and set world speed records, with its S 4, S 5, S 6 and S 6B floatplanes. A solid working relationship with Rolls-Royce's aero engine division was also cultivated during this period.

Vickers Aviation acquired a majority shareholding in Supermarine in 1928, and this helped the company survive the lean interwar period when few military orders were on offer. Indeed, the bulk of Supermarine's work during this time centred on the construction of 79 Southampton flying boats for the RAF.

On 20 February 1932 Supermarine submitted its response to F.7/30 to the Air Ministry. This took the form of the Type 224, powered by a 600hp



For a full 26 months, Spitfire prototype K5054 was the only example of the aircraft in existence. Flown by Capt Joseph 'Mutt' Summers for the first time on 5 March 1936, it subsequently undertook all development flying through to May 1938, when the first production aircraft was completed by Vickers Supermarine. (Author's Collection)

Rolls-Royce Goshawk II engine. Unlike most rival designs, which stuck with the tried and tested biplane layout that harked back to World War I, the Type 224 – unofficially christened the 'Spitfire' by the manufacturer – was a monoplane. The Goshawk II used the newly developed evaporative cooling system rather than conventional external radiators, which in turn meant that the aircraft could feature cleaner aerodynamics.

The Type 224, with its distinctive low-mounted cranked wing and fixed 'trousered' undercarriage, made its first flight on 19 February 1934. The aircraft's development was soon hampered by serious engine overheating problems caused by the evaporative cooling system, and when these proved insurmountable, the Goshawk II (itself a development of the far more successful Kestrel) was cancelled.

Unlike the company's elegant and stylish floatplane racers, the Type 224 was a less-than-attractive aircraft with a top speed of just 228mph due to its overly thick wing, fixed undercarriage and heavy all-up weight – the prototype was 700lb heavier than had initially been estimated. With Specification F.7/30 stating that the winning design had to be capable of attaining at least 250mph, it came as no surprise when Gloster's SS 37 biplane was selected by the Air Ministry in July 1935. With a top speed of 257mph, and being considerably more manoeuvrable than the Type 224, the SS 37 had been developed from Gloster's successful Gauntlet biplane. The new fighter would enter service with the RAF in January 1937 as the Gladiator I.

Undaunted by this initial failure, Reginald J Mitchell and his team started work on a new fighter with a far cleaner airframe that featured a retractable undercarriage and a more powerful engine. The latter had emerged from Rolls-Royce in late 1934 in the form of the PV 12 (later renamed the Merlin). The company rated the engine at 790hp when unveiled, although engineers hoped to eventually get 1,000hp from it with further development.

Vickers allocated funds for Mitchell and his team to proceed with their PV 12-powered fighter, which was designated the Type 300. Although initially started as a private venture, the Air Ministry soon became interested in the

aircraft. On 1 December 1934 it issued a contract worth £10,000 to Vickers Supermarine for construction of a prototype to Mitchell's 'improved F.7/30' design, the new fighter receiving the designation F.37/34.

First Prototype

The combination of foresight on the part of the Air Ministry, the creation of an outstanding engine in the form of the Rolls-Royce PV 12 (later christened the Merlin) and the technical genius of Reginald J Mitchell sired the Type 300 – precursor of the Spitfire. No longer required to use the temperamental and underpowered Goshawk engine, Mitchell and his team chose a new derivative of the tried and tested Kestrel powerplant for their private venture fighter of 1934.

The new Rolls-Royce engine was a third larger both in terms of its weight and size in comparison with the Goshawk, so in order to compensate for the forward shift in the centre of gravity, the sweepback of the leading edge of the fighter's cantilever wing was reduced. Soon, the wing – which was some 9ft shorter in span than the cranked wing of the Type 224 – had taken on an elliptical shape, as aerodynamicists at Vickers Supermarine calculated that it would create the lowest induced drag in flight. Such a flying surface also meant that the wing root would be thick enough to house the undercarriage when retracted.

According to Beverley Shenstone, the aerodynamicist on the Type 300 team, 'I remember once discussing the shape [of the wings] with R J Mitchell, and he said, jokingly, "I don't give a bugger whether it's elliptical or not, so long as it covers the guns!" The ellipse was simply the shape that allowed us the thinnest possible wing with sufficient room inside to carry the necessary structure and the things we wanted to cram in.'

Mitchell's mentioning of the guns in this quote reflects the fact that in April 1935 Vickers Supermarine was asked by the Operational Requirements section of the Air Ministry to double the firepower being installed into the wings of its new fighter by fitting eight rather than four lightweight, compact and reliable 0.303-in. Browning machine guns. Each weapon would have its own 300-round ammunition box.

One of the final problems overcome with the prototype Type 300 (construction of which had commenced in December 1936) prior to the aircraft being rolled out for the first time centred on the cooling for the PV 12 engine. Rolls-Royce had hoped to use the Goshawk's evaporative system once again, but this had performed so badly in the Type 224 that Mitchell was forced to go with an external radiator, and the drag it produced.

However, a newly developed ducted radiator designed by Fred Meredith of the Royal Aircraft Establishment promised to offset the drag through its ability to expel compressed, heated air at increased velocity through a divergent duct. Thus, when the prototype was rolled out of the Woolston works on the banks of the River Itchen, in Hampshire, for the first time in February 1936, the aircraft featured a Meredith-type ducted radiator beneath its starboard wing.

By then the Air Ministry had issued the F.37/34 specification for a frontline fighter, this requirement being prepared around Mitchell's proposed Type 300.

Spitfire I K9794 leads a six-strong formation of aircraft (one of which was flown by Sgt George Unwin) from No 19 Sqn on a flight from Duxford on 31 October 1938. The non-standard '19s' on the fighters' fins were applied shortly before this press-generated sortie, and then swiftly removed once it had taken place. (Author's Collection)

Following a series of ground runs, the prototype (on which £14,637 had been spent up to 28 February 1936) was dismantled and transported by truck to the Vickers Supermarine airfield at Eastleigh, in Hampshire. Once reassembled and passed fit to fly by the Aeronautical Inspection Directorate, the unpainted Type 300, wearing the serial K5054 and RAF roundels, took to the skies at 1630 hrs on 5 March 1936. At the controls was the company's chief test pilot, Capt Joseph 'Mutt' Summers, who was aloft for just eight minutes. Once back on the ground, Summers told the groundcrew 'I don't want anything touched'. This statement has been repeatedly misunderstood by historians over the years to mean that K5054 had performed faultlessly. In reality, Summers had simply wanted to discuss how the brief flight had gone with Mitchell and the design team before the prototype's control settings were altered.

At that point the aircraft lacked armament and panels for the undercarriage (which was locked down for the first flight), the engine was fitted with individual exhaust stubs and it had a biplane-type tailskid rather than a castoring tailwheel. Although then still lacking its soon-to-be-famous name, K5054 looked every inch a Spitfire.

Remarkably, this aircraft would serve as the solitary prototype, conducting all the pre-production development work between 5 March 1936 and the first flight of the premier production Spitfire I (as the fighter was officially named by the Air Ministry on 10 June 1936) in May 1938.

For the prototype's second flight, K5054 had its wooden, two-bladed, fine-pitch propeller replaced with a high-speed unit of a coarser pitch. The aircraft's undercarriage was also unlocked. An improved Merlin was fitted shortly thereafter, and from 24 March 1936 'Mutt' Summers allowed his assistants, Jeffrey Quill and George Pickering, to take over the test programme. In April ground resonance testing was undertaken at Farnborough, in Hampshire, with excessive wing flutter identified in a dive that saw the aircraft restricted to a maximum speed of 380mph. Upon its return to Eastleigh, K5054 had its rudder horn balance reduced in size, underwing air intake modified, engine cowlings refined and undercarriage doors fitted.

Shortly thereafter, the previously natural metal prototype was painted light blue/grey overall. When testing recommenced on 11 May, K5054 attained a top speed of 348mph thanks to the fitment of a new propeller. This allowed Vickers Supermarine to publicly state that the prototype was the world's fastest military aircraft.

The prototype was flown to Martlesham Heath, in Suffolk, on 26 May so that the RAF's Aeroplane & Armament Experimental Establishment (A&AEE) could perform a service evaluation on K5054. Eight days later, the Air Ministry placed its first production order for 310 aircraft, even though the A&AEE had only just commenced its test programme. The newly christened Spitfire was ferried back to Eastleigh on 16 June, and 48 hours later K5054 was displayed to the press for the first time. The prototype was the star of the RAF Pageant at Hendon on 27 June, and it also participated in the Society of British Aircraft Constructors show at Hatfield, in Hertfordshire, 48 hours later.

Once back at Martlesham Heath, K5054 was fitted with eight 0.303-in. machine guns and an improved Merlin F engine rated at 1,035hp (the original Merlin C produced 990hp). It was quickly found that the weapons were badly affected by low temperatures at altitude, so the A&AEE halted firing trials until these problems could be rectified by Vickers Supermarine. In December a radio, mast and aerial were also installed, as was a twin tailwheel, although the latter was soon replaced with a single tailwheel when the original set-up proved prone to getting clogged with mud.

One of the more unusual trials undertaken by K5054 during this period saw split peas glued onto the airframe so as to simulate dome-headed rivets. Vickers Supermarine hoped to use the latter in the construction of production-standard aircraft due to them being less costly and easier to work with than flush, countersunk rivets. However, dome-headed rivets caused increased drag, and the flight trials with the split peas were undertaken so as to determine where each type of rivet could best be used to minimise such drag.

On 22 March 1937 K5054 endured a wheels-up forced landing with Flg Off Sam McKenna at the controls when the aircraft's engine overheated due to low oil pressure. Thanks to the skill of the pilot, it suffered only modest damage to the airframe. Whilst the aircraft was being repaired, a gun heating system was installed in an effort to cure the stoppage problem. Prototype triple ejector exhausts, built by Rolls-Royce, were also fitted. It was quickly found that they pushed the aircraft's maximum speed up to 360mph by developing 70lb of thrust. The exhausts later became standard equipment on all Spitfire Is. Finally, K5054 was repainted in RAF Dark Earth and Dark Green camouflage over silver dope.

The fighter suffered further damage when landing following night flying trials, thus confirming that the Spitfire was unsuited to nocturnal operations. K5054 was still being repaired following its second night accident when the first production example (K9787) made its maiden flight on 15 May 1937. The prototype returned to the skies on 19 July, less than six weeks after Reginald J Mitchell had succumbed to cancer on 11 June at the age of just 42.

Into Production

The revolutionary stressed-skin structure of prototype Spitfire K5054 proved difficult for Supermarine to replicate effectively when it came to building production examples in jigs. The aircraft's elliptical wings could not be constructed using existing production techniques, and being all-metal, they were both hard to make and hard to repair. Progress to this point had also been

slowed by the redoing of the prototype drawings so that they could be used as blueprints from which to build combat-capable Spitfires – this task took a full year to complete.

Once it came time to cut, forge or cast metal, Vickers Supermarine, which had never previously been contracted to build so many aircraft (the Air Ministry had placed its first production order for 310 Spitfire Is on 3 June 1936) encountered further problems finding sufficiently skilled workers to man its production line.

Unlike Willy Messerschmitt, who had taken production needs fully into account when designing his contemporary Bf 109, Reginald J Mitchell had sacrificed everything for performance. As a result, the Spitfire took two-and-a-half times as long to build as a Hawker Hurricane and twice as long as a Bf 109.

With its 500-strong workforce fully occupied producing fuselages, Vickers Supermarine had to sub-contract work on the wings out to General Aircraft and Pobjoy, wing ribs to Westland, leading edges to The Pressed Steel Company, ailerons and elevators to Aero Engines Ltd, tails to Folland, wingtips to General Electric and fuselage frames to J Samuel White & Company. Final assembly and engine installation was completed at Eastleigh. Outsourcing this work should have solved the company's production issues, but it actually created still more problems due to the newness of the fighter's construction. The elliptical wing proved to be particularly challenging, resulting in subcontractors having to learn new manufacturing techniques.

Furthermore, internal redesign of the wing after just four sets had been delivered following wing flutter in K5054 caused yet more delays to the point where Air Ministry officials visiting the Woolston plant in early 1937 were dismayed to find fully equipped and completed fuselages sitting idle awaiting the delivery of wings from subcontractors. In fact, a year passed between Vickers Supermarine issuing General Aircraft with an order for 100 sets of wings and the first examples actually reaching Woolston. According to an Air Ministry investigation, the delay was caused by the tardy or inaccurate supply of drawings and parts by the parent company to the subcontractor.

In March 1939 No 65 Sqn replaced its Gladiators with Spitfire Is at Hornchurch, and this photograph was taken at the Essex fighter station shortly after the brand new aircraft had arrived. At least two of the Spitfires (including K9912 in the foreground) retain the original aluminium paint scheme on their undersides, while several others have the newer black and white finish. K9912 had served as a test bed for the Merlin III and de Havilland DH.5/39 two-pitch dural three-bladed propeller. The aircraft was later lost in a force-landing on a beach west of Dunkirk on 26 May 1940 after it was shot up by a Bf 109. (Author's Collection)

Early Spitfire Is were very much hand-built aircraft, as this view of the final assembly line at Eastleigh clearly shows. In front of the aircraft nearest to the camera is the upper fuel tank, which would be installed immediately forward of the cockpit. These Spitfire Is were part of the first batch of 310 aircraft ordered by the Air Ministry. The engines resting on trestles in the foreground are Merlin IIIs, all destined to power Spitfire Is. (Author's Collection)

Threatened with having the Spitfire programme abandoned altogether, or, at best, losing control of production to a rival manufacturer, the management at Vickers Supermarine eventually convinced the Air Ministry that the rate of manufacture would quickly increase once its workforce, and those of its subcontractors, gained more experience with the new methods of construction associated with the fighter. A second order for 200 Spitfire Is was duly placed on 24 March 1938.

The first two production examples to emerge from Woolston (K9787 and K9788) in May of that same year were retained by Vickers Supermarine to undertake manufacturer's trials from Eastleigh airport. K9787 then went to Martlesham Heath so that the A&AEE could carry out handling trials with the aircraft, while K9788 was sent to Rolls-Royce at Hucknall, in Nottinghamshire, for engine trials. The Air Ministry Certification of Design for the Spitfire was finally issued on 13 July 1938, and the first example – K9789 – to reach a frontline unit (No 19 Sqn at Duxford, in Cambridgeshire) was delivered on 4 August.

The production Spitfire I quickly matured into a frontline fighter to rival the best in the world. Amongst the numerous changes soon made to the aircraft included the replacement of the original two-blade, fixed-pitch Watts wooden propeller with a three-blade two-pitch or variable-pitch de Havilland or Rotol airscrew. The low, flat cockpit canopy was replaced by a bulged hood, thus both improving outward vision and providing more headroom for taller pilots, whilst steel armour plating was introduced behind the seat. A thick slab of laminated glass was fitted to the front of the windscreen, and Identification Friend or Foe (IFF) transponders were built into the aircraft (from September 1940) to identify the fighter as friendly to all-new radar stations along the coast of Britain.

Service Entry

Just three weeks after the Spitfire I had been issued with its Air Ministry Certificate of Design (on 13 July 1938), the first production machine to be delivered to a frontline RAF unit arrived at Duxford for intensive flying trials with No 19 Sqn. The aircraft was flown by a number of pilots from the unit, including future early-war ace Sgt George Unwin, who recalled:

> I wouldn't say that we were terrified at the prospect of flying the Spitfire for the first time, but we were more than a little apprehensive to say the least, since we had been flying the most gentlemanly of machines in the form of the Gloster Gauntlet

biplane since 1935. This aircraft was even easier to handle than the RAF's primary trainer of the period, the Avro Tutor. It touched down at about 50mph, possessed no flaps, no hood and had no retractable anything – indeed, the only thing that moved was the throttle! We went from this thoroughly familiar machine one day, straight on to the seemingly massive brute of a Spitfire the next, without the aid of a dual-control trainer.

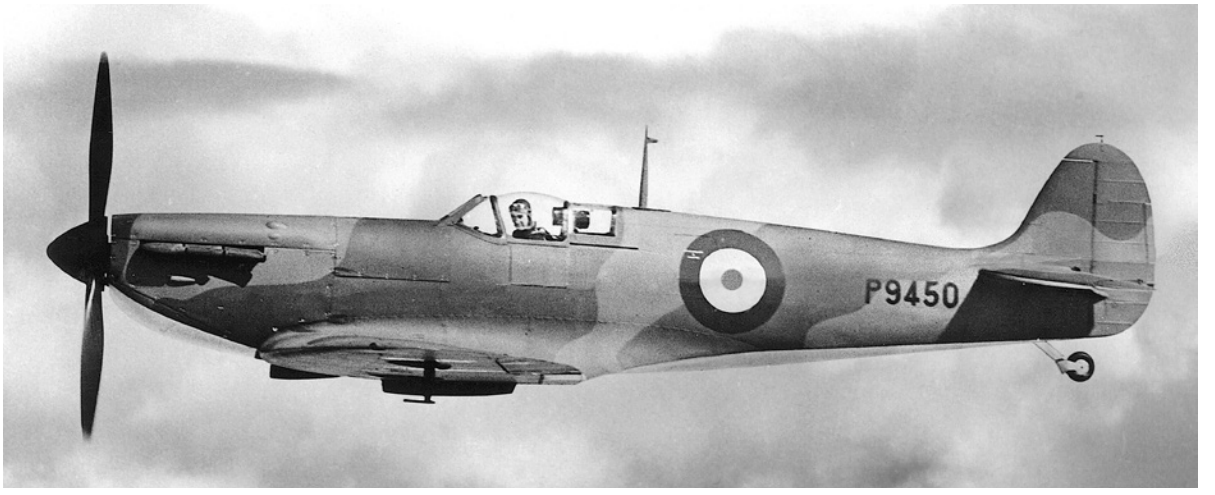
However, a lot of our initial fears were soon removed following the display put on over our airfield by Vickers Supermarine test pilot Jeffrey Quill prior to his delivery of the first Spitfire. This performance would have satisfied any potential pilot of the fighter, and he completed his routine by carrying out a perfect landing just to show us how easy it was.

Nevertheless, we went about our transition without even a set of pilot's notes in those early days of 1938. All we possessed was a scrap of paper on which had been scrawled the climbing, diving, cruising and stalling speeds, and that was about it. After the Gauntlet, the cockpit seemed to be full of switches and levers, operating things like the flaps and undercarriage that popped open and closed. On the first batch of Spitfire Is we received, extension and retraction of the gear was achieved through the pumping of a huge lever sited on the right-hand side of the cockpit – you could always tell a Spitfire pilot undergoing his first solo take-off, for as he pumped on the lever he would push the control column up and down as well, causing the aircraft to porpoise accordingly! Fortunately, powered undercarriage retraction was installed in the next production run.

Sgt George Unwin and 'Flash', his Alsatian, pose with a chocked K9798 (note the serial painted in black and white immediately beneath the two-bladed propeller) at Duxford in late 1938. Ironically, of the 48 different Spitfires Unwin flew with No 19 Sqn between August 1938 and December 1940, this aircraft was not amongst them. This may be due to the fact that K9798 only enjoyed a seven-month life in the frontline prior to being reduced to a static training airframe following a wheels-up landing at Duxford on 18 April 1939. (Author's Collection)

No 19 Sqn quickly put 500 flying hours on the airframe, allowing the unit to work out a rudimentary maintenance schedule that all subsequent Spitfire I-equipped squadrons in RAF Fighter Command would adopt. Pilots also identified a small number of defects that needed to be rectified, including the introduction of powered undercarriage retraction to replace the manual hand pump lever. The narrow track undercarriage also drew criticism from No 19 Sqn, and on 16 August 1938, Plt Off Gordon Sinclair was unlucky enough to have the port wheel break away as he landed back at Duxford upon the completion of his first flight in the Spitfire. The undercarriage leg dug into the grass and K9792 – the sixth Mk I to emerge from the Woolston plant – flipped onto its back. Although Sinclair survived the incident unscathed, the same could not be said for his aircraft. It became the first Spitfire to be written off. The accident was blamed on faulty metal in the axle stub.

Production of the Spitfire I increased slowly during the summer and autumn of 1938, with No 19 Sqn receiving one aircraft per week until the last of its allocated 16 airframes was delivered on 11 November. By the end of December



Spitfire I P9450 performed a dedicated air-to-air photo sortie shortly after the aircraft made its first flight on 5 April 1940. In this side-on view, several key additions to the Spitfire I are clearly visible. It has the streamlined aerial mast with a triangular attachment point and aerial wire to the fin, an external armoured windscreen, an armoured panel over the forward fuel tank, a voltage regulator visible to the rear of the pilot's headrest and a single-pronged pitot tube. This aircraft subsequently saw combat with No 64 Sqn from June to December 1940. (Author's Collection)

just 49 Spitfire Is had reached the RAF, with a further 18 delivered in January 1939, 27 in February and 13 in March. No 66 Sqn, also Duxford-based with Gauntlet Is, commenced its conversion to the Spitfire I shortly after No 19 Sqn.

The speed difference between the Spitfire and the biplane types (Gauntlet I/IIs, Gladiator I/IIs and Fury I/IIs) previously flown by RAF Fighter Command was significant, with the former having a top speed some 155mph faster than the Fury. The Vickers Supermarine fighter also had a battery of eight 0.303-in. machine guns, compared to just two such weapons in the Gauntlet and Fury and four in the Gladiator.

No 54 Sqn was another unit to make the switch to the Spitfire pre-war, replacing its Gladiators with three-bladed Spitfire Is at Hornchurch from March 1939. Plt Off Alan Deere, who had been with the unit since September of the previous year, was amongst the first pilots to fly the fighter at Hornchurch:

> On 6 March 1939 I flew my first Spitfire, an aircraft very little different from the later marks with which the RAF finished the war. In many respects, however, the Mk I was a nicer aircraft, and certainly much lighter than subsequent marks, which became overpowered and over-weighted with armour plating and cannons. The transition from slow biplanes to the faster monoplanes was effected without fuss, and in a matter of weeks we were nearly as proficient on Spitfires as we had been on Gladiators.

The first Spitfire order had been completed by the second week of August 1939, and upon the outbreak of war with Germany on 3 September, Vickers Supermarine had delivered 306 aircraft. Of this total, 187 were serving with 11 RAF Fighter Command squadrons (Nos 19, 41, 54, 65, 66, 72, 74, 602, 603, 609 and 611) and a further 71 were held at maintenance units, ready to be despatched to the frontline to replace losses. Eleven Spitfires were serving as trials machines, either with Vickers Supermarine or with the various service test establishments, one was allocated to the Central Flying School for use by those writing the pilot's notes on the aircraft, and the remaining 36 airframes had been struck off charge, mostly due to flying accidents.

CHAPTER 3

PATH TO COMBAT

The RAF was blighted by a lack of funding from 1919 until 1936, when the overt rearming of Germany prompted the government of the day to at last provide capital that would allow the air force to carry out its duties effectively in a modern war. Central to this re-equipment was the purchase of new single-seat monoplane fighters in the Hurricane and Spitfire. A large number of pilots would be needed to fly these aircraft in the frontline, and it was obvious that the existing Flying Training School (for Short Service officers and airman pilots) and RAF College (for Permanent officers) output of around 400 pilots a year was grossly inadequate.

As part of the shake-up of the air force instigated by the Air Ministry in 1936, which saw four specialist commands created in place of the Area Commands that had previously existed, RAF Training Command was established. Three years prior to this change, the RAF had already taken steps to improve the volume of its pilot training by establishing a handful of civilian-manned Elementary and Reserve Flying Training Schools (E&RFTSs) equipped with Gipsy Moth, Tiger Moth and B 2 biplanes. It had also established a standardised training programme for future officer pilots at the RAF College at Cranwell, in Lincolnshire, that same year.

Coinciding with the formation of RAF Training Command, the Air Ministry had created the RAF Volunteer Reserve (RAFVR) to train 800 pilots a year. Open to all comers, no matter what their financial or social status, this scheme proved so popular that by 1940 a third of RAF Fighter Command's pilots had joined as reservists – a considerable number were posted to frontline units as sergeant pilots. Prior to this, all recruits entered either as permanent or short-commission officers and non-commissioned officers, or via the Royal Auxiliary Air Force. The latter, created in 1925, mirrored the Territorial Army in that units consisted of groups of men from particular areas who trained together at weekends. These squadrons were quickly manned by wealthy gentlemen, who set the tone for the auxiliaries into the early stages of World War II.

New recruits would encounter the Tiger Moth during short flying courses at an E&RFTS, where they were used to give students a limited number of hours of dual instruction, and at an FTS. At the latter, the young recruit would begin a prolonged flying programme which taught him the relatively simple, but vital, skills of straight and level flight, medium turns, climbing, diving and stall recovery. By the time World War II commenced, the RAF had more than 500 Tiger Moths in service with nearly 40 flying schools. (Author's Collection)

By late 1938 close to 30 (of an eventual total of 48) E&RFTSs had been established, setting student pilots on the path to obtaining their wings through training on Tiger Moths, Magisters and B 2s. Here, both theory of flight and flying instruction was undertaken. Whilst at the E&RFTS, the trainee pilot would make his first solo flight. An element of advanced training was also introduced at these schools with a handful of flights in Hart two-seat biplanes. Students subsequently received more of the same upon their posting to a Flying Training School (FTS), typically equipped with Harts, Battles and Ansons and, from the summer of 1939, Master Is and/or Harvard Is. The latter types were aircraft that had a performance a little closer to the Spitfires or Hurricanes pilots might expect to fly operationally in the event that they were 'streamed' to RAF Fighter Command.

For newly winged pilots assigned to Spitfire units pre-war and during the early months of the conflict, their instructors were generally operational fighter pilots who were being 'rested' from frontline service. Virtually none of them, however, had seen any form of combat, leaving instructors reliant upon RAF manuals such as *Air Publications* (specifically *Air Fighting Tactics*, published in 1938) when it came time to teach the basics of aerial combat. All of this tuition, however, was simply theory, while a significant number of RAF Fighter Command's future opponents flying the Bf 109 and Bf 110 had already learned through combat experience in the skies over war-torn Spain what the best practice for air fighting might be.

Amongst the pilots to encounter the RAF's revised pilot training set-up was Al Deere, who was one of 12 New Zealanders selected to travel to Britain in September 1937 – many young men from across the Empire took up short-service commissions in the air force during this period. Deere was initially sent to the de Havilland Civil School of Flying at White Waltham, in Berkshire, where he undertook an *ab initio* flying course for three months prior to being accepted into the RAF. Towards the end of the course, pilots were asked to make a choice as to whether they wanted to fly bombers or fighters – Deere chose the latter.

Following graduation from the E&RFTS, pilots destined to be commissioned spent two weeks undergoing officer training at RAF Uxbridge, then in Middlesex, where they were fitted with uniforms, prior to heading to an FTS. Deere went to No 6 FTS at Netheravon, in Wiltshire, where he flew Harts in his junior term. Upon completion of this phase of his training, he was awarded his coveted pilot's 'wings' – officially the Flying Brevet – after which he flew Fury fighters (then still very much in service with RAF Fighter

An instructor from No 8 EFTS vacates the back seat of Magister I T9688 prior to sending a student pilot up on his first solo flight at Woodley airfield, Berkshire. This aircraft, which had previously served with No 5 EFTS at Hanworth, in Middlesex, was destroyed in a bombing raid on Woodley on 10 August 1940. (Author's Collection)

Command) during his senior term. Completing his nine months of flying training in August 1938, Deere was posted to Hornchurch, in No 11 Group, to fly Gladiators with No 54 Sqn.

Like most pre-war fighter pilots already serving with frontline or auxiliary units, Deere subsequently made the transition from biplane to monoplane at squadron level without the support of an operational training unit (OTU) – such things did not exist pre-war, as there were insufficient Spitfires and Hurricanes available to supply them to RAF Training Command. Most operational pilots had plenty of flying experience under their belts by the time the switch was made, and the change in types posed few problems. RAF Fighter Command did, however, try and fill the obvious performance gap between an obsolescent biplane fighter or Harvard advanced trainer flown by a brand new pilot in an FTS and the monoplane fighter that awaited him in the frontline. It established several Group Pools in 1939 and equipped them with a handful of Hurricanes and Spitfires, and new pilots would be able to get a precious few flying hours in their logbooks on-type before joining RAF Fighter Command proper.

Initially, biplane fighters had been replaced in the frontline at a leisurely pace due to production difficulties with the Spitfire in particular, but the conversion process was dramatically sped up following the Munich Crisis of September 1938. Had the latter escalated into war, the RAF's frontline fighter force would have struggled to defend southern England from attack by the Luftwaffe. Determined to rectify this situation as quickly as possible, the Air Ministry implemented Master Plan M, which gave top priority to the re-equipment of RAF Fighter Command.

Following the declaration of war in September 1939, all 48 E&RFTSs were brought within the RAF Training Command structure as Elementary Flying Training Schools (EFTSs) – 16 were initially formed. Once finished here, pupils would then progress to Service Flying Training Schools (SFTSs – formerly FTSs prior to the commencement of hostilities), boosted in number

Recently arrived Master Is form an impressive backdrop for student pilots and their instructors of No 5 SFTS at a damp Sealand, in Flintshire, in late 1939. By May 1940 the unit was equipped with 45 Master Is, as well as a handful of Hart biplanes and 63 Oxford twin-engined trainers – both types visible behind the Miles aircraft. Many of the pilots seen here went on to fight in the Battle of France and *Dynamo*. (Andy Saunders Collection)

from six to 11 by early 1940. The types operated at both stages in the training process remained much the same during the first 18 months of the war, although the interwar biplane fighters seen at the SFTSs slowly began to be replaced by more Harvards and the all-new Master.

The Group Pool system, from which operational squadrons were able to draw replacement pilots, and thus relinquish their own training responsibilities so as to concentrate on performing combat missions, soon showed signs of failure in wartime. Indeed, literally thousands of trainee pilots (many with considerable flying hours already in their logbooks) were transferred into other trades in late 1939 and early 1940 because of a chronic shortage of monoplane fighter types within the Group Pools. Spitfires and Hurricanes were urgently needed in the frontline, leaving virtually none for training purposes.

In the early spring of 1940, all Group Pools were redesignated OTUs within RAF Training Command, and the Air Ministry instructed RAF Fighter Command to ensure that sufficient aircraft were made available to these units so that a steady flow of replacement pilots could be sent through them. The OTUs eventually succeeded where the Group Pools had failed thanks to an influx of often combat-weary fighters and equally battle-seasoned staff to instruct would-be frontline pilots.

Pilot's Progress

While Al Deere was quickly coming to grips with the Spitfire I, fellow New Zealander, and future squadronmate, Colin Gray was commencing his flying training following his arrival in England in January 1939. Amongst the first tranche of pilots to reach RAF Fighter Command after Britain's declaration of war with Germany, Gray detailed how he attained his 'wings' prior to joining Deere at No 54 Sqn in his autobiography *Spitfire Patrol*:

> I was to undertake my initial flying training at No 1 E&RFTS, which was run by the de Havilland Aircraft Company at Hatfield, in Hertfordshire – I arrived there on 23 January 1939. At that time, some pilots received their *ab initio* training on Miles Magisters. However, we were to train on Tiger Moths – this was not surprising, since the aircraft were built by de Havilland, who was running our flying school. I was very pleased about this, even though the Magister was considered to be a more sophisticated aircraft, being a monoplane with a tailwheel, flaps and brakes, while the old Tiger Moth was a biplane with a tailskid and none of the other refinements. However, they were delightful aircraft to fly – they certainly

had a lot more feel than a Magister, and required a more delicate touch. I have always felt that if you could fly a Tiger Moth really well you could fly anything.

My instructor sent me solo after 9hr 40min, which I suppose was about average. Our main problem was the weather. The course lasted just about nine weeks, from the last week in January until the end of March, which of course was the dead mid-winter period. It was perishingly cold, with snow the likes of which we had never seen before. The bitterly cold weather meant we had to dress up in all sorts of clothing since the Tiger Moth had an open cockpit and no heating. To try to combat the cold, we wore an inner woolly lining with an outer canvas Sidcot suit, fleecy lined flying boots and both silk inner and outer gloves. It kept us warm, but hardly improved one's feel of the controls.

By the end of March we had completed our allotted 50 hours on Tiger Moths and had qualified for a civilian 'A' licence. Up until this time we had been flying as civilian pilots under training, but we all now proceeded to the RAF Central Depot at Uxbridge for our two-week commissioning course, from which we emerged as 'acting pilot officers on probation'.

Half of my commissioning course was then sent to Drem, in Scotland, and the rest – me included – went to No 11 FTS at Shawbury, in Shropshire. The unit was equipped with two different types of aircraft; twin-engined Airspeed Oxfords for the multi-engined pilots and Hawker Harts for those destined to fly single-engined aircraft. By good fortune, I found myself allocated to a Hart flight, and therefore hoped to be destined for fighters. Although the monoplane Oxford was a modern aircraft, the Hart could only be described as obsolescent. It was an open cockpit, two-seater, fabric-covered biplane with a de-rated 500hp Rolls-Royce Kestrel engine and a fixed-pitch propeller. It had a fixed undercarriage, no flaps, brakes that worked only when they felt like it and an ancient turn-and-bank indicator for blind flying. Although it had a top speed of just 140mph, the Hart was an exciting aircraft to fly.

At the end of our first term, in July, we received our pilot proficiency assessments, mine being above average in all four categories – pilot, aerobatics, instrument

Harvard I N7146 heads up a line of American-built advanced trainers assigned to No 2 SFTS at Brize Norton, in Oxfordshire, in the autumn of 1939. The school switched to twin-engined training only in June 1940, receiving more Oxfords to replace its Harvards. (Author's Collection)

flying and navigation. The second term concentrated on what would be called 'applied' flying; that is, using the aircraft as a weapon of war. This included such things as air-to-air and air-to-ground gunnery, high dive-bombing, low-level bombing and formation flying.

Our flying course at No 11 FTS ended on 21 October after completion of a fortnight's gunnery camp at Penrhos, in North Wales. The air-to-air quarter (deflection) attacks were carried out against a drogue towed by another student pilot, and it was extraordinarily difficult to hit the thing with one slow-firing ancient machine gun. I certainly found it much easier later on with eight Browning machine guns.

At the end of the camp, those of us destined for fighters were attached to the No 11 Fighter Group Pool at St Athan, in Glamorganshire, so that we could fly something more modern before being let loose on a frontline squadron. This was a wise precaution, because by then almost all frontline squadrons were equipped with either Hurricanes or Spitfires, and the transition from an ancient old biplane to one of these may well have caused some problems. No 11 Fighter Group Pool was equipped with a few Harvards for dual instruction and some fairly ancient Hurricane Is, which, although a bit clapped out, were at least the real thing. We all did a few hours' dual on Harvards, which in those days were very modern trainers and hot off the production line. They were two-seater monoplanes with an enclosed cockpit, retractable undercarriage, flaps, brakes, a constant-speed propeller and a full blind flying panel. They were very advanced for their time, and made subsequent conversion to Hurricanes no problem.

I found the Hurricane to be a stable aircraft and quite easy to fly. The firepower of eight machine guns was most impressive, and appeared to knock about 40mph off the airspeed when one pressed the tit [firing button]. The weather at St Athan was terrible while we were there, and by the time I received orders to No 54 Sqn at Hornchurch at the end of November, I had only managed to get ten hours on Hurricanes during our three-week stay.

Al Deere recalled Colin Gray's arrival in *Nine Lives*, noting that,

I had expected a sudden intake of new pilots into the squadron when war was declared, but there was the barest trickle in the months that later followed, and these were the pilots who had been in the pipeline already, with perhaps their final training period being slightly shortened. One of the first to arrive was Plt Off Colin Gray, who, on one of his first trips in a Spitfire, had the misfortune on landing to remove the aircraft's undercarriage on one of the sandbag blast shelters which now ringed the airfield. The shelters reduced the airfield's effective landing area considerably, and Colin had been caught out. The Station Commander was not at all pleased, and it was all the squadron commander could do to dissuade him from having the culprit posted to a drogue-towing outfit. Fortunately for No 54 Sqn, Colin was given a reprieve.

Men like Deere and Gray, along with pilots from Canada, South Africa, Australia and other Commonwealth countries, would see considerable action in the Spitfire I prior to the commencement of the Battle of Britain.

CHAPTER 4
WEAPON OF WAR

As previously noted, just one prototype Spitfire was built by Vickers Supermarine in the form of K5054. This aircraft conducted all the pre-production development work associated with the aircraft between 5 March 1936 and the first flight of the premier production Spitfire I (K9787) on 15 May 1938.

Thoroughly tested by both the manufacturer and the RAF, the hand-built K5054 was progressively altered during this period to more closely represent the 310 Spitfire Is ordered by the Air Ministry in mid-1936. Guns were installed and fired in flight, a modified propeller fitted to improve the aircraft's top speed and the external skin finishing changed to help reduce the time and cost involved in building production Spitfires. Improved versions of the Rolls-Royce engine were also progressively fitted, including the Merlin 'C' (later designated the Merlin II) of 990hp, the Merlin 'F' of 1,035hp and, finally, the Merlin III of 1,030hp. Gun heating trials were also undertaken by K5054.

Badly damaged twice during landing accidents in its brief lifetime, K5054 soldiered on in the vitally important testing role until late October 1938, by which time some of the 20 production Spitfire Is that had emerged from Vickers Supermarine were conducting trials work. Sent to Farnborough to serve as a 'high-speed' hack, the aircraft was finally written off on 4 September 1939 in a fatal landing accident.

The jig-built Spitfire I that followed differed significantly from the hand-built K5054 in a number of key areas, primarily internally. The fighter's

A close-up of a Merlin III, as fitted to the Spitfire I. This particular example, however, was installed in Spitfire IIA P7508, although the general engine arrangement was very similar between the two marks. The Mk IIA featured the Coffman starting system, with its associated rotary magazine for explosive starting cartridges, gas tubing, starter assembly and piston and drive housing all visible in this photograph. (Author's Collection)

This aircraft (probably N3188) was one of the 22 improved Spitfire Is supplied to No 54 Sqn from December 1939, featuring a Rotol RX5/1 three-bladed constant-speed propeller and TR 1133 VHF radio. The latter was fitted in place of the troublesome, short-range TR 9D HF equipment. Ultimately, however, production delays with the TR 1133 saw all RAF Fighter Command units having to revert to the inferior TR 9D immediately after Operation *Dynamo*. Note the wireless aerial mast fitted to the aircraft – a key recognition feature of the improved Spitfire Is issued to No 54 Sqn. The unit saw considerable action with these machines over the evacuation beaches, with Plt Off Johnny Allen making five claims in N3188. (Wingleader Collection)

distinctive elliptical wing had been strengthened so as to raise its never-to-be-exceeded maximum speed from 380mph to 470mph. Flap travel was also increased from 57 degrees to a full 90 degrees, and fuel tankage boosted from 75 to 84 Imperial gallons. Other minor changes were also introduced, and equipment added, that ultimately saw the first production Spitfire I weigh in at 5,819lb fully loaded – 460lb heavier than K5054.

The first 64 airframes were fitted with the Merlin II engine, whilst the remaining Spitfire I/IAs were powered by the 1,030hp Merlin III. From the 78th airframe (delivered in February 1939), the Rolls-Royce engine would be driving a three-bladed de Havilland DH.5/39 two-pitch dural propeller, rather than an Airscrew Company Watts two-bladed fixed-pitch wooden propeller. Although the three-bladed propeller weighed a hefty 350lb compared with just 83lb for the Watts airscrew, it shortened the take-off run from 420 yards to 320 yards, increased the rate of climb, boosted the top speed at 20,000ft from 361mph to 365mph, increased the service ceiling from 31,000ft to 34,400ft and made the Spitfire much easier to handle in combat.

In November 1939, No 54 Sqn was chosen to test 22 brand new aircraft fitted with improved TR 1133 VHF radios and, more importantly, Rotol RX5/1 three-bladed constant-speed propellers made of aluminium/magnesium alloy (all subsequent RX5/1 propellers featured wooden 'Jablo' blades). Unlike the two-pitch propeller, which had to be adjusted manually by the pilot via a cockpit control box above the throttle for various stages of flight, the RX5/1 worked in conjunction with a constant-speed unit fitted to the engine that allowed the blade pitch to be adjusted automatically to correct for variations in engine power and speed. This meant that the propeller operated at the most efficient setting for any given combination of rpm, boost and airspeed. The constant-speed propeller was even heavier (500lb) than the two-pitch type, yet it reduced the still-air take-off distance to 225 yards and gave a substantial improvement in the rate of climb.

Into Service

In August 1938, some 16 months prior to No 54 Sqn receiving the improved Spitfire Is at Hornchurch, Duxford-based No 19 Sqn had become the first RAF

Fighter Command unit to be issued with the new Vickers Supermarine aircraft. As previously noted, Sgt George Unwin played a key role in introducing the fighter into operational service, evaluating all aspects of the Spitfire I during an extensive trials period. A number of issues with the aircraft soon arose, as he explained to the author almost six decades later:

All 12 of No 19 Sqn's Spitfire Is bask in the spring sunshine at Duxford on 4 May 1939, ready to be inspected by the national press. Most of the aircraft are fitted with recently introduced bulged canopies, although at least two still have flat hoods. All of the aircraft lack armoured windscreens, and the view is dominated by the fighters' Airscrew Company Watts two-bladed fixed-pitch wooden propellers. (Author's Collection)

> One of the main complaints that we had at No 19 Sqn about our first batch of Spitfires was the extraordinarily long take-off roll the fighter had with the original fixed-pitch two-bladed wooden propeller, particularly when compared to the nimble and light Gauntlets that we had previously flown. The beautifully crafted prop had been optimised to give its best performance at both high-speed and medium- to high-altitude – the Spitfire was a fighter interceptor after all. However, at Duxford, we only had a grass strip that was 800–900 yards long, and to further compound the squadron's initial problems, following the delivery of our first two Spitfires in early August, we had no wind of any note to assist our take-offs until late September!
>
> We had to resort to taxiing as near to the leeward hedge as possible. The brakes were then applied whilst you opened the throttle flat-out, and once the RPM gauge was showing constant revs, the brakes were released and the Spitfire began its seemingly endless take-off run. Even with this time-consuming preflight procedure, which would have been totally impractical in a proper wartime scramble, the fighter barely cleared the hawthorn hedge at the far end of the grass strip.

Sgt Unwin's CO, Sqn Ldr Henry Cozens, also participated in the early flying trials with the Spitfire I at Duxford:

> I made my first flight in Spitfire K9789 on 11 August 1938 – exactly one week after it had become the first example to reach us. At that time there were no pilots' notes on the Spitfire, no conversion course and, of course, no dual-control aircraft. I was shown round the cockpit, given a cheerful reminder to remember to extend the undercarriage before I landed, wished 'Good Luck', and off I went.
>
> After flying the Gauntlet, my first impression of the Spitfire was that her acceleration seemed rather slow and the controls were a bit heavier than I had expected. Thinking about it afterwards, I realised why. The Gauntlet took off at about 70mph and was flat-out at about 220mph, while the Spitfire took off at about the same speed but could do well over 350mph. In other words, the speed range was much greater, and although the acceleration was in fact greater, it took somewhat longer to reach maximum speed. Moreover, as she neared the top end of her speed range, the Spitfire's controls became beautifully light.

An armourer replenishes belted rounds in the ammunition tanks in preparation for their reloading into a Spitfire. The Spitfire I had eight Browning 0.303-in. machine guns, each with 300 rounds and a rate of fire, when sustained, of 1,150 rounds per minute. A total of 2,400 rounds was carried. Each gun typically expended 19 rounds per second, so 152 rounds per second total – enough for just 16 seconds of continuous firing. (Andy Saunders Collection)

OPPOSITE
A Spitfire I of No 609 Sqn has its guns test-fired and harmonised at the gun butts at Drem in early 1940. The empty shell casings can be clearly seen falling onto the tarmac from the cartridge chutes on the undersides of the wing. The 0.303-in. weapons fired ball, incendiary or armour-piercing rounds. Press photographers are huddled together beneath the port wingtip. (Author's Collection)

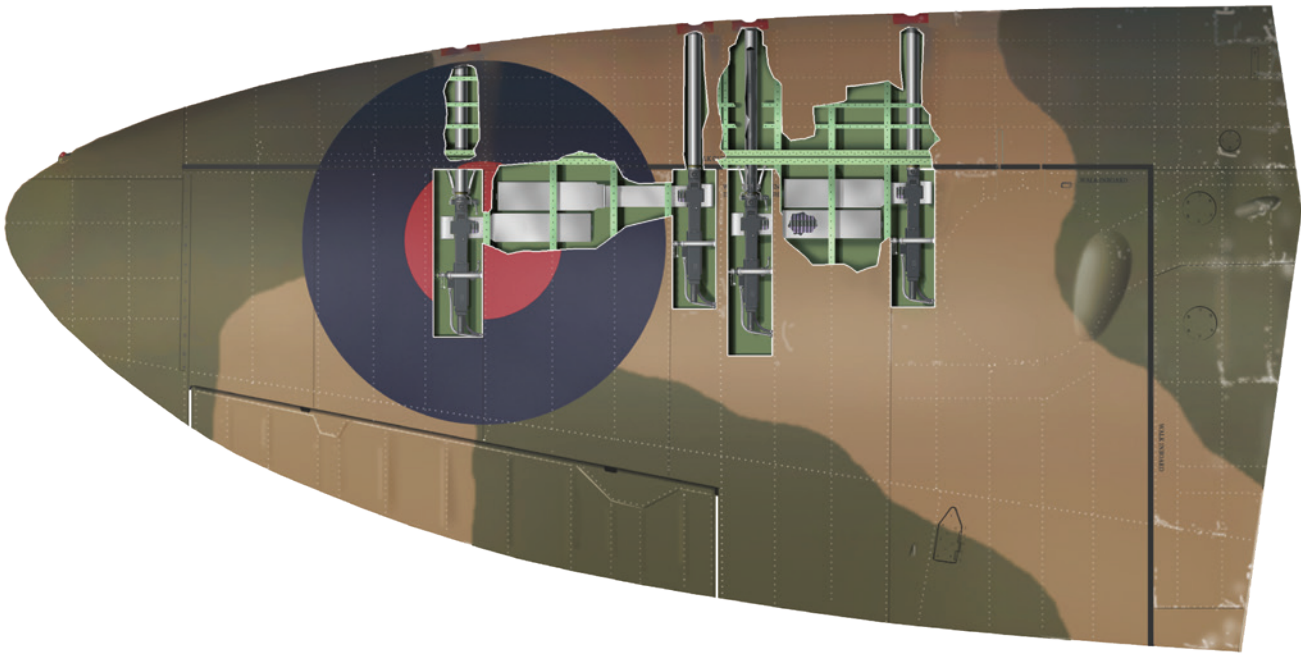
As the intensive flying trials progressed, I became convinced that the Spitfire could take on the Messerschmitt 109, and any other fighter then in existence. But that was not to say she was perfect. For one thing, the engines of these first Spitfires were difficult to start – the low-geared electric starter rotated the propeller blades so slowly that when a cylinder fired there was usually insufficient push to flick the engine round to fire the next one. Also, the early Merlin engines leaked oil terribly. It would run from the engine, down the fuselage and finally get blown away somewhere near the tail. Yet another problem was what we called 'Spitfire Knuckle'. When pumping up the undercarriage, it was all too easy to rasp our knuckles on the side of the cockpit. There was a further problem for the taller pilots, who were always hitting their heads on the inside of the low cockpit canopy.

A raft of modifications were subsequently brought in following an interim report submitted by No 19 Sqn. Engine start-up problems with the Merlin were cured with a more powerful starter motor, an engine-driven hydraulic system to raise and lower the undercarriage replaced the hand pump that was originally fitted and, from January 1939, a bulged canopy was introduced to provide increased visibility and the extra headroom that was needed to allow taller pilots to fly the aircraft in comfort. According to Sqn Ldr Cozens, 'the improved oil seals for the Merlin took a little longer, and leaking oil did remain something of a problem throughout the Spitfire's service life'.

One element of the Spitfire I that was barely changed during the aircraft's production run was its armament. Aside from 30 examples converted to take two 20mm Hispano-Suiza Type 404 cannon, all Mk Is were armed with four Browning 0.303-in. machine guns in each wing. The first examples of the American-designed weapon had entered service with the RAF during its rearmament phase in the mid-1930s, and the 0.303-in. machine gun would be fitted in both the Hurricane and the Spitfire, as well as in the turret of the Boulton Paul Defiant.

Although the Browning's individual rifle-calibre machine gun rounds lacked the destructive punch of a cannon shell, the weapon's rapid rate of fire – 20 rounds per second per gun (160 rounds per second overall) – more than made up for this. Each cartridge fired ball, armour-piercing, tracer or incendiary bullets weighing 11.3 grams at 2,430ft per second. The total weight of the projectiles fired was four pounds per second. Ammunition capacity (300 rounds per gun) was enough for 16 seconds of continuous firing in the Spitfire I.

Following the very first actions involving Spitfires and the enemy, on 16 October 1939, pilots reported problems with gun harmonisation. Amongst those affected was Flt Lt Dunlop Urie of No 602 Sqn, who had attempted to



SPITFIRE I ARMAMENT

The Spitfire I was armed with four Browning 0.303-in. machine guns in each wing. Rate of fire was 20 rounds per second per gun (160 rounds per second overall), and each cartridge fired ball, armour-piercing, tracer or incendiary bullets weighing 11.3 grams at 2,430ft per second. Total weight of projectiles fired was four pounds per second. Ammunition capacity (300 rounds per gun) was enough for 16 seconds of continuous firing in the Spitfire. Although the Brownings were very reliable, they were routinely criticised by RAF fighter pilots for not providing them with sufficient punch when it came time to shoot down German aircraft.

down a Ju 88 from 1./KG 30 following an attack on Royal Navy vessels in the Firth of Forth:

> Two Spitfires of 603 Squadron joined us and also had a go. When we reached St Abb's Head he [the Ju 88] was still flying on one engine, and I decided there was no more we could do. He had been shot at by five fighters, and I would be very surprised if he would cross the North Sea [the aircraft, flown by Leutnant Horst von Riesen, did indeed make it back to 1./KG 30's Westerland airfield on the North Sea island of Sylt]. Undoubtedly, if we had closed to 200 yards, he would have been destroyed. This is with hindsight. Our orders [on gun harmonisation distances] were very clear, and given many times over.

A crew member inspects 0.303-in. bullet holes in the fuselage of an He 111 from KG 26 that managed to struggle back to base after encountering RAF fighters during an attack on merchant shipping off the coast of Scotland during the Phoney War. Despite the Browning 0.303-in. machine guns' excellent rate of fire and impressive reliability, its ammunition was only of rifle-calibre size, which, as in this case, often proved ineffective against heavily armoured German medium bombers. (Andy Saunders Collection)

A thick slab of laminated glass was fitted to the windscreens of Spitfires (and Hurricanes) from November 1939, although some aircraft still lacked this vital addition during the fighting in France in May–June 1940. Its value is graphically illustrated in this photograph of No 66 Sqn Spitfire I N3285 at Gravesend, in Kent, after it took a direct hit during a head-on pass with a Bf 109E over Tenterden, also in Kent, on 5 October 1940. (Author's Collection)

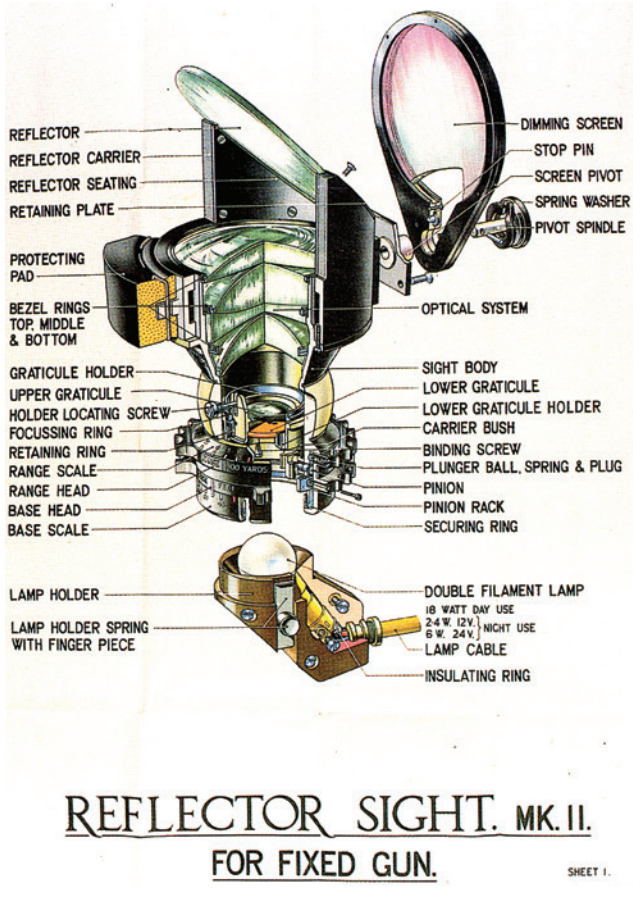
Urie's account highlights a problem repeatedly experienced by many fighter pilots during the early aerial battles. The prewar instruction for gun harmonisation at 400 yards was ineffective, resulting in numerous requests by pilots who had engaged enemy aircraft to have the weapons re-harmonised to 250 yards – a significantly more effective, and destructive, range. Had the guns of Nos 602 and 603 Sqns' Spitfires been adjusted accordingly prior to the 16 October action, more than just two of the nine Ju 88s involved in the Firth of Forth attack would have been shot down.

Early in World War II, once it became clear that pilots of modern fighters needed armour protection from their multi-gunned foes, Air Chief Marshal Sir Hugh Dowding insisted that the previously unarmoured Spitfire I (and Hurricane I) be fitted with a thick slab of laminated glass to the front of its windscreen to shield the pilot from rifle-calibre rounds fired by defensive machine guns installed in German bombers. From November 1939, a 3mm thick light-alloy cover was fitted over the upper fuel tank in the fuselage forward of the cockpit, its job being to deflect rifle-calibre rounds striking the Spitfire at a shallow angle. Lastly, 73lb of steel armour was installed behind and beneath the pilot's seat to protect his head and back from rounds fired from the rear of the fighter. The fitment of the latter, in particular, went against official Air Ministry policy, which stated that seat armour was not required because the Spitfire

(and Hurricane) were too fast to be shot down from behind. Although pilots appreciated the protection offered by the hastily installed armour, there were limits to the amount that could be carried without the aircraft incurring an unacceptable weight penalty.

In the spring of 1940, the RAF also introduced 100 octane fuel in place of the 87 octane that it had previously used. The Spitfire I's Merlin III engine had to be modified to use the new fuel, which gave improved performance at heights below the full-throttle altitude of 16,500ft. The higher-octane fuel allowed an increase in supercharger boost from +6lb to +12lb without risk of detonation that would damage the engine. A pilot could select the additional boost for a maximum of five minutes by advancing the throttle 'through the gate' to the fully forward position. The emergency power setting increased maximum speed by 25mph at sea level and 34mph at 10,000ft. It also improved the fighter's climbing performance between sea level and full-throttle altitude.

IFF transponder equipment was introduced from September 1940, thus allowing radar operators on the ground to identify the aircraft they were tracking on their plots. Adding 40lb to the Spitfire's weight, its wire aerials strung between the tips of the tailplane and the fuselage shaved 2mph off the fighter's maximum speed. The lack of such equipment was the primary cause of the chaotic 'Battle of Barking Creek' (see Chapter 6 for further details). Fighter controllers being able to identify friendly aircraft on radar justified the slight reduction in performance caused by the fitment of IFF.



Dated August 1939, Air Ministry Directorate of Technical Development's Air Diagram No 122 features the inner workings of the Barr and Stroud GM 2 reflector gunsight (officially known as the Reflector Sight Mk II) as fitted to the Spitfire I and other British fighters during the early war period. (Andy Saunders Collection)

Early Spitfire Is had nothing more than a World War I-era ring-and-bead gunsight for pilots to aim through. However, during 1939, the Barr and Stroud GM 2 reflector gunsight was fitted to the Spitfire I as standard. This unit, which had been created by the company in 1935, featured a lens through which a large circular graticule was projected onto a circular glass reflector screen 76mm in diameter. The graticule was bisected by a cross, the horizontal bar of which was broken in the centre, with the range/base setting being set via two knurled rings with their own scale that turned a Perspex pointer to various range settings, and an adjustable ring which turned an indicator to wingspan in feet. The internal mechanism then set the gap according to the required range. A central dot was added as a further aiming point.

The pilot first set the span dial to the known wingspan of his prospective target, then the range dial to the maximum for accurate fire. When the target coincided with the gap it was within range. The radius of the graticule ring gave

the deflection allowance required for hitting a target crossing at 100mph. The gunsight was illuminated by a half-silvered 12v lamp in a quick release holder at the base of the sight body. A substantial rubber pad was fitted to protect the pilot from injury in the event of a rough landing.

Chosen by the RAF as its standard fixed gunsight, the GM 2 was known as the Reflector Sight Mark II in frontline service. Patented in 1937, the first sights of an initial order of 1,600 reached operational squadrons from 1938. The GM 2 sight was used in most British fighters serving with the RAF and the Fleet Air Arm between 1938 and 1943.

Car-type rear-view mirrors of various shapes and sizes also began to appear in Spitfire Is in operational units shortly after war was declared, with some being mounted internally and others externally. Initially, they were acquired by pilots from commercial motor spares outlets such as Halfords and then fitted by groundcrew. External mirrors with triangular or rectangular fairings became commonplace during the spring of 1940, and by August of that year a standard bracket-mounted mirror had been introduced to the Spitfire production line.

These improvements made the Spitfire I a much better fighter, but they also added weight to the airframe. When the first production examples entered service, the maximum speed of the aircraft was quoted as 362mph at 18,500ft. K9787, which was the first Spitfire I built, tipped the scales at 5,819lb, but it lacked any of the modifications detailed in this chapter. By June 1940, following the evacuation of Dunkirk and the fall of France, the weight of a fully equipped Spitfire I had increased to about 6,150lb and the maximum speed reduced to 350mph. It was, however, a far more potent fighting machine than the original aircraft.

Production of the Spitfire I ran from April 1938 through to March 1941, by which time 1,567 examples had been built.

An early example of the car-type rear-view mirror fitted internally by a number of pilots in the months after war was declared. These were initially acquired from commercial motor spares suppliers such as Halfords. Eventually, by August 1940, a standard external mirror attached to the windscreen frame by a bracket had been introduced to the Spitfire production line. (Wingleader Collection)

CHAPTER 5
ART OF WAR

As good as the Spitfire was, its employment by RAF Fighter Command in the first year of the war was adversely affected by the rigid implementation of unwieldy tactics known as Fighting Area Attacks when up against the Luftwaffe. Their formulation stemmed from the early 1930s, when the sole purpose of the fighter element of the RAF was to stop formations of enemy bombers from attacking Britain. The fighters being built throughout this decade (both biplane and monoplane) possessed limited range, and with France as an ally, it was assumed that no enemy aircraft of this type would be able to reach British airspace. Bombers would be forced to attack unescorted. Senior officers also believed that with monoplane fighters now capable of achieving speeds in excess of 300mph, high-speed manoeuvring combat was no longer possible. Reinforcing this point, the 1938 edition of the RAF's *Air Fighting Tactics* manual boldly stated:

> Manoeuvre at high speed is not now practicable because the effect of gravity on the human body during rapid changes of direction at high speed causes a temporary loss of consciousness, deflection shooting becomes difficult and accuracy is hard to obtain.

War, however, quickly revealed that although high-speed manoeuvring was indeed uncomfortable, fatiguing and generally hard work, determined fighter pilots regarded these issues as minor impediments, rather than factors that constrained their effectiveness.

During the Phoney War, it was geography that proved to be the primary barrier preventing Spitfires from engaging German fighters in aerial combat. All Spitfire-equipped units remained based in Britain, while Luftwaffe fighters then flying exclusively from airfields in Germany lacked the range, or the necessity, to venture close to the British Isles. In RAF Fighter Command, it was the accepted wisdom that enemy bombers attacking targets in Britain would not have fighter escorts. The idea that France might be defeated and occupied,

No 19 Sqn fly in 'vics' of three during the Press Day at Duxford on 4 May 1939. The individual three-aircraft sections have been positioned almost line abreast so that all 12 Spitfires would appear in a single photograph. Normally when in Battle Formation heading into combat, the four 'vics' would follow closely in line astern, with the formation leader (the unit CO or a flight commander) flying the aircraft heading the first 'vic'. (Author's Collection)

and that Britain would have to continue the fight alone, did not receive serious consideration.

RAF fighters were armed exclusively with rifle-calibre 0.303-in. machine guns at this time, and their weight of fire was deemed to be insufficient to bring down bombers flying in tight, massed formations when attacking independently of one another. The RAF's Air Fighting Development Establishment therefore decided that the only way to solve this problem was to mass fighters in close formation so as to bring a large number of guns to bear. Pilots in frontline fighter units were well drilled in formation flying, so a series of six basic patterns known as Fighting Area Attacks were formulated and published in the *Air Fighting Tactics* manual of 1938. They were at the heart of standard squadron air drills, as Al Deere recalled:

> The majority of our training in a pre-war fighter squadron was directed at achieving perfection in formation, with a view to ensuring the success of the flight and the squadron attacks we so assiduously practised. The order to attack was always preceded by the flight commander designating the number of the attack, such as 'Fighting Area Attack No 3 – Go'. These attacks provided wonderful training for formation drill, but were worthless when related to effective shooting. There was never sufficient time to get one's sights on the target, the business of keeping station being the prime requirement.

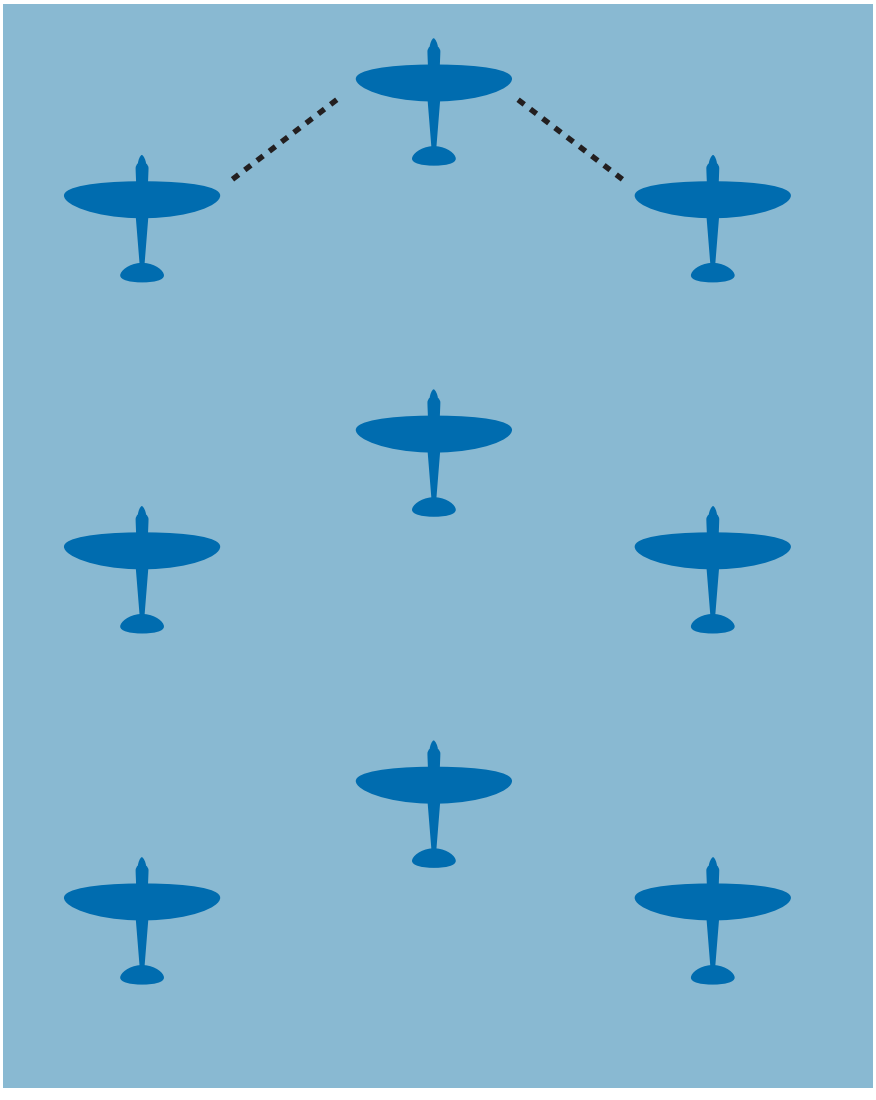
The whole point of fighter interception using Fighting Area Attacks was to disrupt and destroy the bomber formation, and whilst an escorting fighter attack needed to be guarded against, it was the bombers that the RAF fighters were principally after. Quite apart from the differing formations flown as the squadrons climbed, patrolled or went into battle, the actual fighter attack methods employed once the fighters had sighted the bombers remained set. In RAF parlance, these were standard Fighter Attacks Nos 1, 2 or 3. Additionally, the Air Ministry set out detailed instructions in respect of the overall policy of attacking escorted bomber formations, thus:

Fighters versus Escorted Bombers

i. It is essential that leaders should weigh up the situation as a whole before delivering attacks. Rushing blindly in to attack an enemy may have disastrous results and will certainly be less effective.
ii. Never fly straight, either in the formation as a whole or individually. When over enemy territory, alter course and height with a view to misleading A.A. [anti-aircraft artillery].
iii. Keep a constant watch to the rear of the formation of aircraft.
iv. Upon hearing close gun fire, turn immediately. Hesitancy in so doing may result in effective enemy fire. Do not dive straight away.

v. Before taking off, search the sky for enemy fighters, and if they are known to be about, turn as soon as possible after taking off. Enemy fighters have frequently dived on aircraft whilst taking off from their aerodrome. Similar remarks apply during landing.
vi. Conserve ammunition as much as possible. A short burst at effective range is usually decisive, and leaves further ammunition for further attacks.
vii. Exploit surprise to the utmost. The enemy has been taught to do this, and you should be prepared accordingly.
viii. Always remember that your objective is the ENEMY BOMBER.

Much of the entrenched attitude to formations and tactics referred to in the paragraphs above may well have been because, at this early stage of the war, many fighter squadrons were being led by COs who had been appointed by dint



RAF Fighter Command's standard interwar tactical formation of three-aircraft 'vics' proved to be inflexible and often dangerous when squadrons encountered fighter escorts during their attempts to shoot down enemy bombers. The fighters flew so close together that only the lead pilot (usually the squadron CO or one of the two flight commanders) had time to search for the enemy, with the remaining pilots having to focus on their position-keeping while in formation.

A classic 'attack' by a section of Spitfire Is from No 610 Sqn, captured on film by a photographer sitting in an unidentified RAF aircraft (possibly a Battle) during the early summer of 1940. Although the 'queuing up' procedure was appropriate when engaging an unescorted formation of bombers, it meant the RAF pilots undertaking such an attack were highly vulnerable to escorting fighters bouncing them from above. (Author's Collection)

of age, experience and seniority within the service. The fact of the matter was that all these elements militated against such COs, and their success (or lack of it) in leading air fighting.

In terms of age, these were often pilots well into their thirties or sometimes just beyond – old men in the young man's world of air fighting! In respect to their perceived experience, these leaders may well have been veteran *fliers*, but they had no experience of aerial combat. As to seniority, herein lay another problem. Being long in the tooth and dyed in the wool, these fighter leaders all had RAF service discipline and the adherence to following orders instilled into them. Thus, the very idea or notion of bucking the system and going against what their training or manuals had instructed could only be anathema to them.

Lacking the combat experience of their foes, many of whom had seen action during the Spanish Civil War and/or the Polish campaign of September 1939, RAF Fighter Command pilots were forced to rely on the perceived wisdom handed down by successive generations of fighter pilots since 1918, and the rigidity of inflexible formation tactics that required fighters to fly in fixed groups that saw them formate on the leader. This meant that only he was able to freely look around the sky, whilst the remaining ten or 11 pilots concentrated on holding formation.

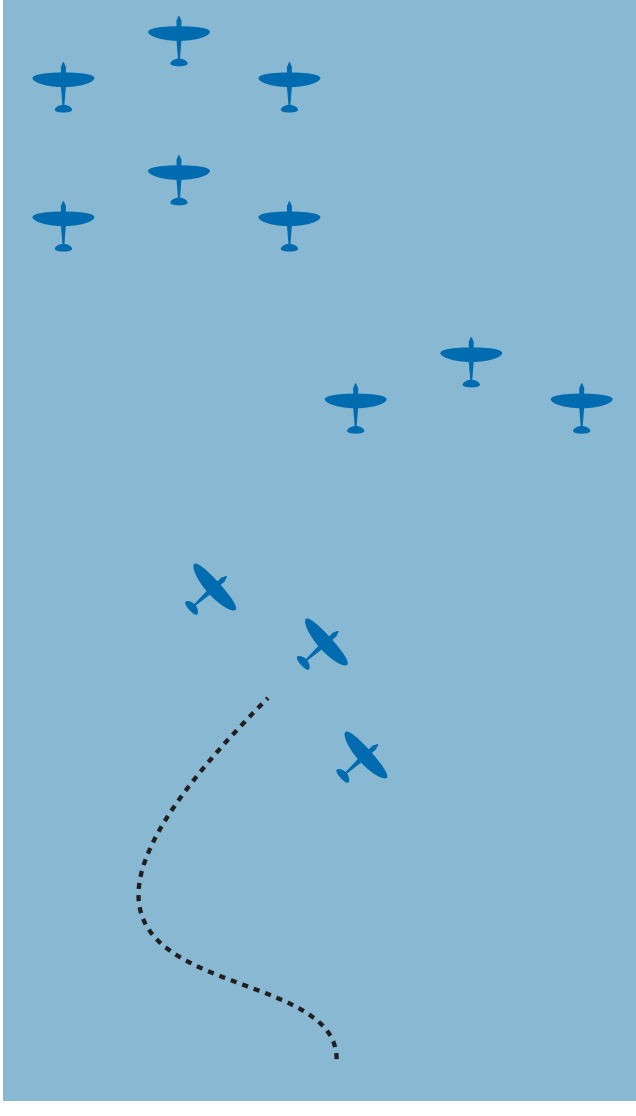
The standard RAF fighter Battle Formation at the time was the V-shaped 'vic' of three aircraft. A squadron of 12 Spitfires would be split into two flights, A and B, and these were in turn made up of two sections of three fighters. Notwithstanding the variety of formations flown as squadrons went into battle, once it was realised that enemy bombers could also have dedicated fighter escorts, all of them had a 'weaver' who would fly a reciprocal pattern, to-and-fro, above and behind the formation on the lookout for a surprise attack. Rather than rely on a singleton weaver, some squadrons would put a section of three aircraft on the task. Often, though, it was the weaver who was picked off first, without having seen the attacker he was on the lookout for.

When in full-strength Battle Formation, all 12 aircraft would be tightly grouped together in four sections of three fighters. Leading the 'vic' would be the squadron CO or senior flight commander, with succeeding 'Vs' following in close line astern. Once bombers had been spotted, it was the leader's job to position his fighters a short distance behind the enemy formation and then lead the attack in section after section – each section would deliver its attack after the one ahead had pulled out of the way. Upon engaging enemy bombers, the pilot,

according to the *Air Fighting Tactics* manual, 'stays until he has exhausted his ammunition, the target aircraft has been shot down, or he himself has been shot down or his engine put out of action'.

Such attacks would have worked well against German bombers had it not been for the presence of agile escort fighters sweeping the skies ahead of them. Luftwaffe tactics were far more flexible in nature, and centred on smaller formations of Bf 109s and, to a lesser degree, Bf 110s engaging other fighters. As RAF Fighter Command would soon find out to its cost, Fighting Area Attacks were useless against small, nimble formations of high-performance fighters such as the Bf 109E. Indeed, upon seeing British fighters flying into combat in tight, neat rows of three, German pilots, who invariably enjoyed a height advantage, quickly dubbed the 'vics' '*Idiotenreihen*' ('rows of idiots').

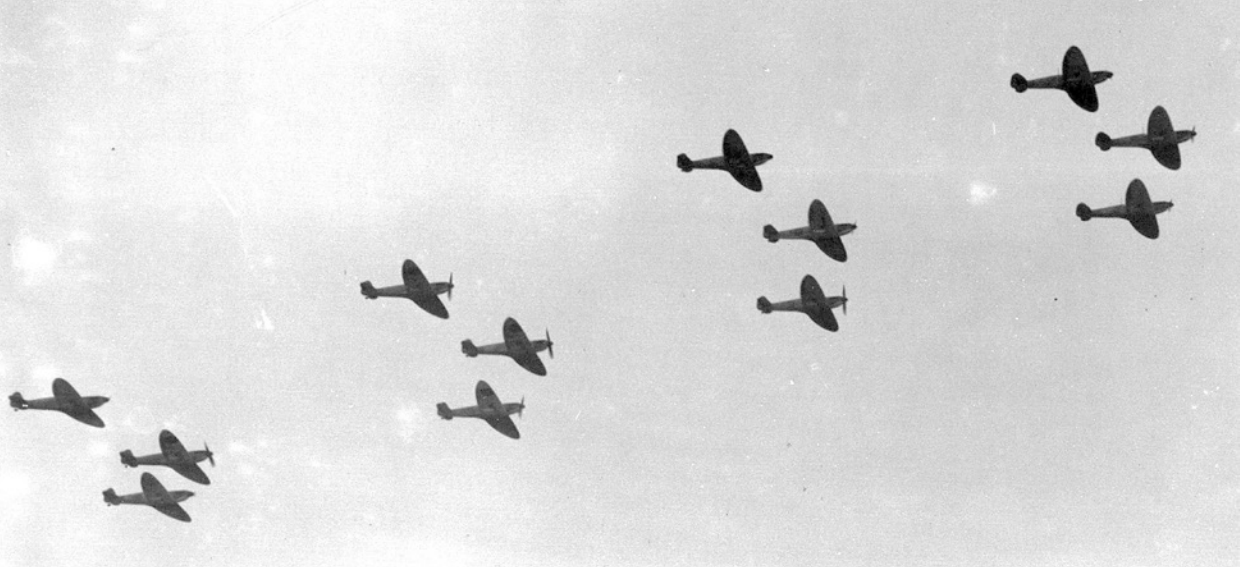
Those pilots that survived their initial encounters with the enemy soon came to realise that a successful combat formation had to be able to manoeuvre while maintaining cohesion. Pilots also needed to cover each other's blind areas so as to prevent surprise attacks on the formation – hence the hasty addition of the 'weaver' to all formations larger than a section in strength. Finally, individual members of the formation had to be able to support each other should they come under attack.



The Luftwaffe's four-strong *Schwarm* (based on the loose pair, or *Rotte*, which was at the heart of all German fighter formations) met all these criteria, but RAF Fighter Command's tight 'vics' did not. The *Schwarm* could turn as tightly as any individual aircraft within the formation, whereas the 'vic's' rate of turn was limited by the need for it to pivot on the aircraft on the inside of the turn. When looking for the enemy, all the members of the looser *Schwarm*, flying about 200 yards apart and almost in line abreast but with the leader slightly ahead, enjoyed the freedom to search the skies (and cover blind areas astern of the formation) without the fear of running into a wingman. Conversely, in the 'vic', only the leader searched for the enemy, as his two wingmen had to concentrate on remaining in tight formation. This left them highly susceptible to attack from behind and below, and this blind spot was repeatedly exploited by Luftwaffe fighters in 1940.

Finally, if a *Rotte* or *Schwarm* was bounded from behind, a quick turn by the formation would see the attacker immediately come under threat himself. If the rear section of a Spitfire formation was bounced, the aircraft under attack (typically the 'weaver') had usually been shot down well before another pilot could attempt to fend off the enemy fighters.

As the aerial fighting over the evacuation beaches reached its climax, and RAF Fighter Command became painfully aware of the superiority of the enemy's tactics, Spitfire (and Hurricane) units started to experiment with different formations. One derivation of the standard Battle Formation of three or four 'vics' saw the last section ordered to weave behind the main body of the squadron to prevent enemy fighters from effecting a bounce from above – a tactic used to deadly effect by Bf 109 and Bf 110 units in May–June 1940. This hasty change did little to negate the problem, however, with exposed 'weavers' suffering heavy casualties, particularly during the Battle of Britain.



When this photograph was taken from the ground at Duxford on 4 May 1939, the Spitfire Is of No 19 Sqn had reverted to a Battle Formation more orthodox in its appearance to that seen on page 36. This is how the unit would have appeared when it saw combat for the first time over Dunkirk on the morning of 26 May 1940, Sqn Ldr G D Stephenson leading the unit in an attack on Ju 87s. (Author's Collection)

OPPOSITE TOP
Flg Off Bob Tuck demonstrates his skills as a marksman during a clay pigeon shoot at Hornchurch in the spring of 1940. He would join No 92 Sqn as a flight commander at Croydon shortly after this photograph was taken, and then experience considerable action over northern France – Tuck made 11 claims between 23 May and 2 June. According to high-scoring ace 'Johnnie' Johnson, 'The best fighter pilots were usually outdoor men who had shot game and wildfowl and therefore knew something about deflection shooting. The man who could hit a curling, dropping pheasant coming at him on a strong wind, or a jinking head-on partridge, or who could kill a widgeon clearly in a darkening sky, had little trouble bringing his guns to bear against enemy fighters.' (Author's Collection)

The futility of these formations, and the Fighting Area Attacks, was brought home to the Spitfire squadrons in their first engagements over Dunkirk. Plt Off Al Deere was lucky to escape with his life when No 54 Sqn tried to carry out such an attack on He 111s over the French coast on 24 May 1940:

At 1430 hrs the squadron was once again airborne and en route for the by now familiar coastline of northern France, under orders to patrol inland of Dunkirk/Calais. I was flying as number two in red section, which was led by the 'Prof' [Flt Lt James Leathart], with [Plt Off] Johnny Allen as number three. This was our tenth offensive patrol as a section since the emergency began, and was to prove to be the first of many successful engagements in which we figured together as a team. On this patrol all of us had the feeling that something would happen. Prior to take-off, we learned that two other Hornchurch [Spitfire] squadrons had been engaged, that that there was considerable enemy activity over the area.

The squadron had not been on patrol very long before Flt Lt Max Pearson's voice screeched over the R/T, 'Tally ho, tally ho, enemy aircraft above and ahead'. About 3,000ft above us, and clearly silhouetted against a blue sky, a large formation of German bombers ploughed westwards towards Dunkirk unmolested and apparently unprotected. 'Sitting ducks', I thought.

'Hornet squadron, full throttle, climbing to attack', came the order from the 'Prof', who was leading the squadron. 'Hornet squadron, No 5 attack, No 5 attack, GO.'

It seemed an age before we made the extra 3,000ft in height, and even longer before we closed the gap to firing range.

Simultaneously, the sections fanned out into the various echelons necessary for this type of attack, and as they did so individual pilots selected a particular bomber target. So far, all very nice and exactly according to the book. But we had reckoned without interference from the fighter escort – after all, no consideration had been given to it in designing this type of attack, and our peacetime training had not envisaged interference from escort fighters. Experience is dearly bought.

'Christ, Messerschmitts – BREAK, BREAK.'

There was no need for a second warning. At the word 'Break', and with one accord, the squadron split in all directions, all thoughts of blazing at enemy bombers ousted by the desire to survive. As I pulled back violently on the stick

into a steep turn, one fairly singed my eyebrows as it screamed past my port wing, the pilot endeavouring unsuccessfully to haul his aircraft around to attack me.

Somehow, No 54 Sqn suffered no losses to the attacking Bf 109Es during the ensuing action, its pilots instead claiming nine German fighters (but, crucially, no bombers) destroyed. Once back at Hornchurch, pilots began to question the sense of the tactics used by the unit on this patrol. Amongst the most vociferous was future ace Plt Off George Gribble:

Begging your pardon 'Prof', but No 5 attack, I ask you! Didn't we agree that those stupid set piece attacks were all right in peace but unlikely to prove any bloody good in war? Everybody was so damned busy making certain he got into the right position in the formation that we were very nearly all shot down for our pains.

Flt Lt Leathart responded:

Sorry, George, I thought we would have one go with the Fighting Area Attacks. After all, we've spent most of our fighter training practising them. Anyhow, as far as I could see there was no fighter escort. Where the hell did they come from?

Plt Off Colin Gray immediately answered his flight commander's question, having had his aircraft turned upside down by a cannon shell that exploded within the Spitfire's fuselage:

From behind me – I felt them. In future, I've no intention of offering myself as a target to Hun fighters while the rest of the squadron disappears in all directions other than that in which some unfortunate, like me, is getting hell beaten out of him.

Plt Off Colin Gray patrols over Essex in one of the 22 improved Spitfire Is delivered to No 54 Sqn from December 1939. The future Kiwi ace had a close shave on 24 May 1940 when his unit attempted to undertake a Fighting Area Attack on He 111s over the French coast. Gray's aircraft was singled out by Bf 109s that bounced the squadron from above while they were still climbing to engage the enemy bombers. This Spitfire is probably N3030, which failed to return following an attack on a lone photo-reconnaissance Ju 88 over Dunkirk on the morning of 27 May 1940. No trace of the aircraft or its pilot, Flt Lt Max Pearson, were ever found. (Author's Collection)

Four of the six pilots seen here enjoying the spring sunshine at Hornchurch in April 1940 participated in the unsuccessful Fighting Area Attack on German bombers on 24 May 1940. Flt Lt James Leathart, sitting at the far left, ordered the attack, while Plt Off Colin Gray, who came close to being shot down when the unit was bounced, is leaning on his flight commander's chair. Standing at far right is Plt Off George Gribble, and sitting in front of him is Flt Lt Max Pearson. Leathart, Gribble and Pearson all claimed Bf 109s destroyed in the subsequent melee, while Gray was credited with damaging a German fighter. (Author's Collection)

Although No 54 Sqn vowed there and then to abandon Fighting Area Attacks, 'vic' formations would remain the norm well into 1941. Indeed, officially, pilots were forbidden from implementing new tactics at unit level, the RAF's *Air Fighting Tactics* manual of 1938 stating that 'Squadron Commanders are not to practise forms of attack other than those laid down, unless they have been specially authorised by Headquarters, Fighter Command.'

As early as June 1940, RAF Fighter Command had officially noted that Luftwaffe fighters in combat 'normally operate in pairs. If two pairs are flying together prior to combat, they usually fly in a finger-four formation' (that is, positioned as if each aircraft were at the tip of each finger on an imaginary outstretched hand). However, it was very much left to individual RAF fighter squadrons to work out their own tactics once it became clear that the so-called 'Hendon Air Pageant' formations were not only failing to counter enemy bomber formations, they were causing the loss of pilots and aircraft. Nevertheless, some squadrons would rigidly stick to what the training manuals had instructed.

Even though this serious flaw in RAF tactics had been cruelly exposed by the end of Operation *Dynamo*, during which Spitfire and Hurricane units were often outfought by smaller numbers of German fighters, there was little time available for RAF Fighter Command to rectify the problem through the issuing of new tactics on the eve of the Battle of Britain. Future ace Plt Off Bobby Oxspring, who flew Spitfires with No 66 Sqn during 1940, explained the predicament then facing operational fighter pilots:

> We knew that there was a lot wrong with our tactics by the summer of 1940, but it was one hell of a time to alter everything we had practised when we were in combat three or four times a day. Moreover, we were getting fresh pilots straight out of flying schools who were trained, barely, to use the old type of close formation attacks – they simply would not have coped with something radically different.

CHAPTER 6
COMBAT

The Spitfire I first fired its guns in anger on the morning of 6 September 1939, just three days after Britain had declared war on Germany. In one of the earliest examples of fratricide in World War II, several Spitfire, Hurricane and Blenheim squadrons were scrambled to engage an unidentified incoming force of aircraft detected by the radio direction finding (RDF – radar) station at Canewdon, inland from the Essex coast, at 0600 hrs.

One of the pilots involved in this unfortunate episode was Plt Off D S 'Sammy' Hoare of No 74 Sqn:

> It is reasonable to assume that a degree of panic and confusion would have arisen at Canewdon, which had detected a false plot off the Essex coast, and that a conclusion was erroneously drawn that something big was about to happen. More squadrons would have been brought to readiness, including those in adjacent sectors; other RDF stations would have been alerted, as would the Observer Corps and AA batteries, all of which would have resulted in a flood of information being fed to the controller. More sections or flights were ordered off to intercept and identify those already airborne, each in turn appearing as unidentified plots on the table as a result of technical problems.
>
> The picture now was one of aircraft being directed and redirected all over the sky, chasing each other and probably sometimes even themselves. One has to sympathise with personnel at Canewdon, below ground and with inadequate and unreliable IFF, and consequently less able to sort friend from foe than anyone above ground. The fact was that no one reported seeing and positively identifying an enemy aircraft, as of course there were none anywhere in the vicinity. It was all a classic example of the 'snowball effect', and who eventually ordered a halt to the situation two hours later is not known.

Due to a fault with the RDF's sensing equipment, false indications appeared on radar screens for a 'raid' approaching from the east, which was the expected direction of any Luftwaffe attack. The weather over the Thames Estuary

was poor, with banks of thick low cloud that covered the area further complicating the task of aircraft recognition. However, at higher altitude, conditions were appreciably better. Anti-aircraft guns at Sheerness and Thames Haven engaged the 'enemy' formations, damaging a Spitfire from No 65 Sqn.

A few minutes later, near Colchester, the formation leader of a section of Spitfires from No 74 Sqn spotted 'enemy aircraft' to the east. With the sun in their eyes, the pursuing pilots failed to spot that their opponents were in fact two Hurricanes from No 56 Sqn (based at North Weald, in Essex) also searching for the spurious Luftwaffe contacts. What ensued became known as the 'Battle of Barking Creek', as two Spitfires shot down one Hurricane, killing Plt Off John Hulton-Harrop, and caused the pilot of a second machine to force-land.

As previously noted, Plt Off Hoare was one of 12 pilots from Hornchurch-based No 74 Sqn scrambled to intercept the 'intruders':

> I was flying in 'B' Flight. It was a beautiful morning [at higher altitude], with an absolutely cloudless sky – you could see for miles, and we could see other formations of aircraft, but we didn't bother to chase them or anything. But 'A' Flight, led by Flt Lt 'Sailor' Malan, with Flg Off [T B] Paddy Byrne leading the second section, presumably saw something of which they were suspicious. I don't know whether they were being directed on to it or it was a casual sighting. Anyway, Paddy Byrne led his section towards two aircraft from North Weald. Whether or not Byrne had been instructed to do so by Malan, or by the [Canewdon] controller, I do not know. Nor do I know if any attempt at positive identification was made, or who gave the order to attack. But anyway, they came up behind the Hurricanes and shot them down.

Plt Off Johnny Freeborn was one of the two No 74 Sqn pilots to down Hurricanes in error on 6 September. Seen here in August 1940 following promotion to flying officer and receipt of the DFC, he put this unfortunate incident behind him and duly made five claims in the defence of the Dunkirk beaches in May 1940. Freeborn subsequently flew more operational hours than any other fighter pilot in the Battle of Britain. (Author's Collection)

Plt Off Johnny Freeborn was part of Flg Off Byrne's Yellow Section:

> There was a call to scramble, and 'A' Flight, led by Flt Lt Malan, took off, leading the first three aircraft of Red Section, with Paddy Byrne following with the second three of Yellow Section. We were quite a bit away from the first section of aircraft, and were trying to catch them up, when Malan sounded the 'Tally Ho' over the R/T, seeing these supposedly enemy aircraft.

The sad thing about it was, as squadron adjutant, I had to take the squadron order book around the pilots, which they signed to confirm that they all understood that under no circumstances were they to attack any single-engined aircraft. At that stage of the war, the German fighters could not get to us, their range being unable to carry them that great distance.

Anyway, the attack was sounded, and our section went in and we shot down the two unidentified aircraft, which turned out to be Hurricanes.

OPPOSITE TOP
Spitfire Is of No 74 Sqn take off from Hornchurch in flight strength during the summer of 1939. These aircraft are wearing the JH codes allocated to the unit until the outbreak of war, when No 74 Sqn switched to ZP. (Author's Collection)

This incident highlighted the need for a means of distinguishing friendly aircraft on radar. Such a device – IFF – was already under development, but it would not enter service with Spitfire-equipped units until September 1940. The station commander at North Weald and the two Spitfire pilots (Byrne and Freeborn) who had shot down the Hurricanes later stood trial by court martial, the former receiving a cursory punishment and the latter being exonerated.

During the Phoney War that lasted from 3 September 1939 until the German *Blitzkrieg* was launched in the West on 10 May 1940, Spitfire units rarely encountered enemy aircraft. The fighter first engaged a Luftwaffe aircraft on 16 October 1939 when Nos 602 and 603 Sqns were scrambled to intercept nine Ju 88s targeting Royal Navy warships in the Firth of Forth. Two bombers from 1./KG 30 were shot down, with a third machine limping back to Germany on one engine. Following this action, No 603 Sqn was credited with downing the very first German aircraft to fall to RAF Fighter Command. One of the pilots involved in this historic engagement was Plt Off J S 'Black' Morton, whose diary entry for the 16th noted:

Flt Lt 'Patsy' Gifford of No 603 Sqn led sections of Spitfires that achieved three early victories over German bombers during October 1939, earning him a DFC. Gifford was made CO of Hurricane-equipped No 3 Sqn the following month, and he was killed in action when shot down by a Bf 110 on 16 May 1940 during the Battle of France. (Andy Saunders Collection)

About 2.25 [pm] 'A' Flight ordered off. Red – P.G. [Pat Gifford], Ken [Macdonald], Robbie [Robertson] – to patrol Drem. Yellow – George [Denholm], Sheep [Gilroy], Self – took off 3–4 minutes after Red. At about 2,000ft to west of airport fired on by A.A. – 4 bursts 400ft to right of us. Almost immediately saw 3 or 4 E.A. [enemy aircraft] circling over Forth Bridge at 5,000ft, informed George, who had already spotted 3 E.A. to south of us. Pursued in line astern. E.A. making for bank of cloud over Currie. Did not identify all E.A., but one definitely Heinkel [all were in fact Ju 88s]. Followed Sheep through gaps in cloud, George in lead, firing at 1 E.A. At other side of cloud no sign of George, Sheep pursuing one turning to port. I took starboard and followed it through two more clouds, shooting short bursts from low No. 1 position. E.A. speed 190–200mph. E.A. fired tracer, reddish brown puffs. Very strong impression of two or more guns firing. E.A. failed to make the next cloud and started to lose height, swinging to the north towards Wallyford. At end of this long burst I was shaken to see something black fall off E.A., shied violently away from it.

Was approaching to make a further attack when 3 Spitfires shot past me from above. They had obviously

The first enemy aircraft brought down on British soil was this He 111H of *Stab./*KG 26, which force-landed at Humbie, in Scotland, on 28 October 1939 after being attacked by Spitfires of Nos 602 and 603 Sqns. (Andy Saunders Collection)

not seen me, so I broke away and returned to re-arm. The last I saw of E.A., it was at about 500ft over Port Seton being vigorously attacked by Red [section]. E.A. eventually came down in sea off Port Seton, very badly shot up.

P.G. considers E.A. his trophy, but I feel inclined to dispute it, as from my own observations and report from prisoners, E.A. was partly disabled (port engine u/s) before Red section appeared. I certainly hit him, for one gunner was killed. This must have been the lower [gunner], as Red reported fire from top gunner up to last moment, and I was certainly shot at from below at beginning of engagement.

I was so excited that I failed to identify type of E.A. Was surprised to find no trace of being scared, though crouched down a bit when tracer observed going by.

The pilot of Morton's Ju 88 was Oberleutnant Hans Storp, who, having dive-bombed the light cruiser HMS *Southampton*, had attempted to make good his escape. He subsequently recalled:

Then, I commit my biggest mistake. I climb. Suddenly, out of a serene sky, machine guns firing at us. My co-pilot calls out, 'Spitfires behind us!' But the first spatter of bullets had hit us. My left engine was out of action. I took violent evasive action. Ten to twelve Spitfires were after me. I resembled a hare shot and wounded, but still chased. My gunner had been killed in the first burst. I pressed my bird down. To get away was our only thought. But the Spitfires curved around us like devils. One burst after the other made a sieve of our Ju.

The hell-like flight went right over the roofs of Edinburgh. Here, we had some respite for a few seconds. The British did not want to shoot when over the city. My only thought was that the machine should not go down on land: it should not fall into enemy hands. I steered towards the sea. Where had the British hunters come from so quickly? Why had we not spotted them earlier? These were the thoughts that kept me busy while I was steering. My bird was finished. At about 700ft the elevators went out of action. The machine capsized,

Spitfire I XT-H (serial unknown), nicknamed 'Hell', was amongst the early Vickers Supermarine fighters delivered to No 603 Sqn from September 1939. It is seen here at Turnhouse, from where the unit was scrambled on 16 October 1939 to intercept Ju 88s attacking Royal Navy warships in the Firth of Forth. (Author's Collection)

nose forward, and fell into the sea like a stone. In the last second, I was able to throw off the roof of the cockpit. I was thrown 70 yards, still fastened to my seat. I came to under water, and swam to the surface.

Several He 111s and He 115s were also claimed by Spitfire pilots from Nos 41, 72, 602 and 603 Sqns during the latter half of October. Indeed, the He 111 from *Stab*./KG 26 credited to the latter two units on the 28th that crashed near Kidlaw, in East Lothian, was the first Luftwaffe aircraft shot down by RAF Fighter Command pilots to actually fall on British soil intact.

Exactly one week earlier, No 72 Sqn had opened its account when Flg Offs T A F 'Jimmie' Elsdon and Des Sheen (both future aces) were scrambled from readiness at Leconfield, just north of Hull, to intercept a number of contacts 15 miles southeast of Spurn Head, off the coast of the East Riding of Yorkshire. The fighters had been sent aloft following reports of a convoy under attack by nine He 115 floatplanes from 1./*Kü.Fl.Gr.* 406. According to Australian Flg Off Sheen:

Amongst the pilots to look over the 'Humbie Heinkel' was Sqn Ldr Andrew Farquhar, CO of No 602 Sqn. Spitfires from his unit had played a central role in the actions on both 16 and 28 October, resulting in the destruction of three bombers. Farquhar had been credited with damaging two He 111s (actually Ju 88s) during the Firth of Forth engagement on the 16th. (Author's Collection)

We took off as a pair and headed out to sea, where we soon came across the He 115s pressing home their attack. Once they spotted us, two of them peeled off and struggled to gain height in order to offer the remaining floatplanes some semblance of top cover. 'Jimmie' Elsdon and I immediately took them on, and as I closed on my He 115, its rear gunner attempted to put off my aim by blazing away with his weapon, but I soon silenced him. The next burst may have killed the pilot, for the Heinkel started to fly erratically, and with this I turned away to look for another target. I never actually claimed the floatplane destroyed, but was later credited with it as a confirmed victory.

In the months that followed, Spitfires continued to have occasional encounters with individual German bombers, minelayers or reconnaissance aircraft. On 20 November, for example, No 74 Sqn chased and shot down a Do 17 detected by radar while searching for convoys off the Essex coast. Less than three weeks later, on 7 December, seven He 111s from 1./KG 26 targeting merchant ships off the east coast of Scotland were intercepted by Nos 72 and 603 Sqns. Again, Flg Off Sheen was involved in the action, but on this occasion the clash did not end quite so well for him. When the bombers were detected at midday north of Arbroath, in Scotland, heading for the Tay Estuary, No 72 Sqn's alert section of six Spitfires was scrambled from Drem, in East Lothian. Sheen recalled what subsequently transpired:

We soon spotted the formation, which was carrying out an armed reconnaissance along the east coast. They must have thought that there would be no fighters this far north, so our presence no doubt came as a nasty shock to them. They had dropped

Thousands of miles from home, Flg Off Des Sheen left little doubt as to his country of origin by marking Spitfire I K9959/ RN-J with a distinctive boomerang insignia beneath the cockpit. Frequently flown by the Australian in the first months of the war, the fighter (with Sheen in the cockpit) was photographed at Leconfield in October 1939. On the 21st of that month he used it to down an He 115, followed by a third of a victory against an He 111 on 7 December – both Sheen and the fighter were hit in the latter engagement, which took place north of Arbroath. K9959 would serve with No 72 Sqn until mid-August 1940, after which it was converted into a photo-reconnaissance aircraft. (Author's Collection)

down to low-level in order to try and evade No 603 Sqn Spitfires [three of which had intercepted them and then been forced to break off their attacks due to dwindling fuel], so we in turn dived down to their altitude. I remember quite vividly zooming past Bell Rock lighthouse at eye-level in pursuit of a fleeing bomber.

As I commenced firing on my chosen target, a gunner in a second He 111 off to the left-hand side of 'my' bomber hit me with an accurate burst in the cockpit. I was struck in the ear by one round and hit in the backside by another, whilst a third ruptured my petrol tank [the latter was an incendiary round, which failed to ignite the fuel and was found in the tank by the groundcrew]. Petrol began to stream into the cockpit, and when I went in again to attack I began to feel dizzy with the fumes and decided to return home. Upon landing, I was soon bundled into an ambulance, and proceeded to spend Christmas convalescing in the hospital in Edinburgh Castle, which was most pleasant.

Two bombers eventually ditched due to battle damage inflicted by Nos 72 and 603 Sqns. Exactly two weeks later, in a repeat of the 'Battle of Barking Creek', Nos 602 and 603 Sqns were scrambled to intercept an incoming 'raid' that was actually a formation of Hampdens from No 44 Sqn. Two of the RAF bombers were downed in error.

Further clashes with solitary He 111s and Ju 88s over the North Sea and off the Firth of Forth in the first three months of 1940 resulted in victories for Nos 54, 66, 152, 602, 603 and 609 Sqns. According to Flg Off Hector MacLean of No 602 Sqn:

> The object [for the Spitfire pilots] was to catch the wily Heinkels and Ju 88s who had been sneaking in under the radar cover to bomb and strafe merchant ships and fishing boats, and even lighthouses. This did not improve their reputation on the east coast of Scotland, but in spite of that, I had to admit a grudging respect for the German aircrews engaged in this work. They were hard to find, but when we did intercept them, they would be outnumbered, outpaced and out-gunned. Without handy cloud cover, they were doomed.

Increased activity also saw a rise in operational casualties, with three Spitfires and their pilots being lost when they crashed into the sea during convoy patrols in late February. On 3 April, in yet another action fought off the east coast of England, future ace Flg Off Norman Ryder of No 41 Sqn, based at Catterick, in North Yorkshire, claimed the final victory credited to the Spitfire prior to the *Blitzkrieg*. However, his aircraft was hit by return fire from the He 111 of *Stab* II./KG 26 that he had attacked, forcing Ryder to ditch off the North

Yorkshire port town of Whitby. He was the first pilot to survive such an event in the Spitfire, being rescued by a fishing boat from Grimsby, in Lincolnshire.

The British press reported that Ryder's Spitfire was the first home-based aircraft of RAF Fighter Command to be shot down by an enemy aeroplane. It was also noted that the RAF had destroyed 50 Luftwaffe aircraft up to then.

Throughout the Phoney War, RAF Fighter Command had continued to rapidly expand in size as more Spitfire Is reached the frontline. By the beginning of May a further eight units (Nos 64, 92, 152, 222, 234, 266, 610 and 616 Sqns) had been issued with the Vickers Supermarine fighter, thus increasing the strength of the force to 19 squadrons by the time the *Blitzkrieg* commenced in western Europe.

Three Spitfire Is of No 65 Sqn sit at readiness at Northolt, which was then in Middlesex, in early 1940. The aircraft feature quintessential late Phoney War national markings, which saw the fuselage roundels applied without the outer yellow ring and no fin stripes – both were hastily introduced in May 1940. K9907/YT-D and K9911/YT-E were downed by Bf 109s on 8 July and 8 August 1940, respectively, while L1094/YT-H was damaged in the same action that saw the destruction of YT-E. The latter aircraft has the mounts for night vision exhaust shields forward of the cockpit. (Andy Saunders Collection)

Sqn Ldr Farquhar's Spitfire I K9962 receives routine maintenance at Drem in February 1940. The aircraft featured artwork below the cockpit in the form of an Edinburgh Castle Lion, a saltire and a swastika, with two smaller crossed out swastikas to the right of it. The latter denoted Farquhar's Phoney War successes in this aircraft. K9962 was damaged on 22 February 1940 when Farquhar overturned the fighter in boggy ground at East Coldingham after landing near an He 111 he had just forced down, in an attempt to stop the crew from destroying their bomber. (Author's Collection)

Battle of France

The Phoney War came to an abrupt end on 10 May 1940, when German forces launched an all-out offensive in the west. Although RAF Fighter Command had reluctantly sent a steady stream of Hurricane units to France from the autumn of 1939 as part of the British Air Forces in France (BAFF), it had kept all of its Spitfire squadrons firmly based on British soil and under direct RAF Fighter Command control. This meant that the initial air actions as a result of the *Blitzkrieg* were fought well beyond the range of the Spitfire units in southern England. The rapid advance of the Wehrmacht, and the Luftwaffe aircraft supporting it, soon altered this situation, however.

Just 48 hours into the campaign, Duxford-based No 66 Sqn flew a brief patrol over The Hague, on the Dutch coast, where its pilots found a solitary He 111 and shot it down. RAF Fighter Command had also undertaken patrols over the Hook of Holland that day, one of which saw Spitfires and Defiants (of No 264 Sqn) operating together over the Continent for the first time. On 13 May, a flight of No 66 Sqn Spitfires, again paired up with a flight of No 264 Sqn Defiants, intercepted a formation of Ju 87 dive-bombers during an early morning patrol over Rotterdam and claimed four of them shot down and three unconfirmed destroyed, along with a Bf 109. However, five Defiants and a solitary Spitfire were lost in return during what was almost certainly the first clash between the RAF's premier fighter and its German rival.

No 66 Sqn's Flg Off Ken Gillies was almost certainly the first Spitfire pilot to engage a Bf 109 in aerial combat, encountering the German fighter shortly after his unit had intercepted Ju 87s attacking targets near Rotterdam during a dawn patrol on 13 May 1940. Having downed a Stuka, he then went after a Bf 109 and subsequently claimed it as unconfirmed destroyed. By the time he was killed in action on 4 October 1940, Gillies had made 17 claims. (Author's Collection)

While the Hurricane units of the BAFF (which controlled aircraft assigned to both the Advanced Air Striking Force and the BEF) and, to a lesser extent, RAF Fighter Command took a pounding as Allied troops fell back in the direction of the French coast, the Spitfire squadrons continued to see only sporadic action. No 54 Sqn's Al Deere described this frustrating period as follows in *Nine Lives*:

> On the evening of 15th May we were briefed by the Station Commander [at Hornchurch], Wg Cdr 'Boy' Bouchier, about offensive operations the following day over the French and Belgian coasts in support of the British Army's withdrawal. This was the moment we had trained for and dreamed about. Excitement ran high in the squadron, and there was an expression of purposeful endeavour for the first time in months.
>
> Quietly, Bouchier informed us that things were very serious in France and that certain British withdrawals were planned in the direction of Dunkirk and Calais. The Commander-in-Chief [RAF] Fighter Command had been directed to provide as much air cover as possible for these planned withdrawals, and Spitfire squadrons, operating strictly from home bases, were to be used for this task. 54 Squadron was to take off as soon as possible after first light tomorrow to patrol about ten miles inland from Calais–Dunkirk to engage any enemy aircraft operating in the area.

So it came about that at 0800 hrs on Wednesday, 16th May, 12 Spitfires bounced across the grassy surface of Hornchurch airfield and, becoming airborne, headed eastwards for the French coast. I was one of the 12, confidently piloting my *Kiwi I*, as I had named my Spitfire, towards the Channel, and action. Pride of place on this memorable flight had been given to the 12 most experienced pilots.

Steadily, we climbed to 15,000ft, where we levelled out and throttled back to an economical cruising speed. Our instructions were to stay in the area as long as possible, and it was important, therefore, to conserve fuel for the combat zone. Slowly, the broken coastline of Kent was left behind to be replaced by the sand-fringed shores of northern France and Belgium, now gradually taking shape. In a matter of minutes the formation was crossing in over Calais. As it did so, there was a hum in the earphones as the R/T was switched on and the CO's voice crackled over the air. 'Hornet squadron, battle formation, battle formation, GO.' Symmetrically, like the fingers of an opening hand, the sections spread outwards. All was still below us, and no movement disturbed the peaceful French countryside, which presented a panorama of changing patterns stretching into the distance finally to merge with the horizon.

For 30 minutes we cruised up and down our patrol line and, as each succeeding minute ticked by and there was no sign of the enemy, expectation gave way to doubt, doubt to uncertainty and uncertainty to a final bitter disappointment as the formation finally turned homewards. Back at base, the groundcrews concealed their disappointment in the feverish activity of refuelling, while the pilots walked dejectedly towards the dispersal hut. On entering the hut, we were confronted with eager questions from the five pilots who had been left behind.

'What did it feel like, Al, knowing that at any moment a Hun might pop up and take a pot at you?' asked Colin Gray.

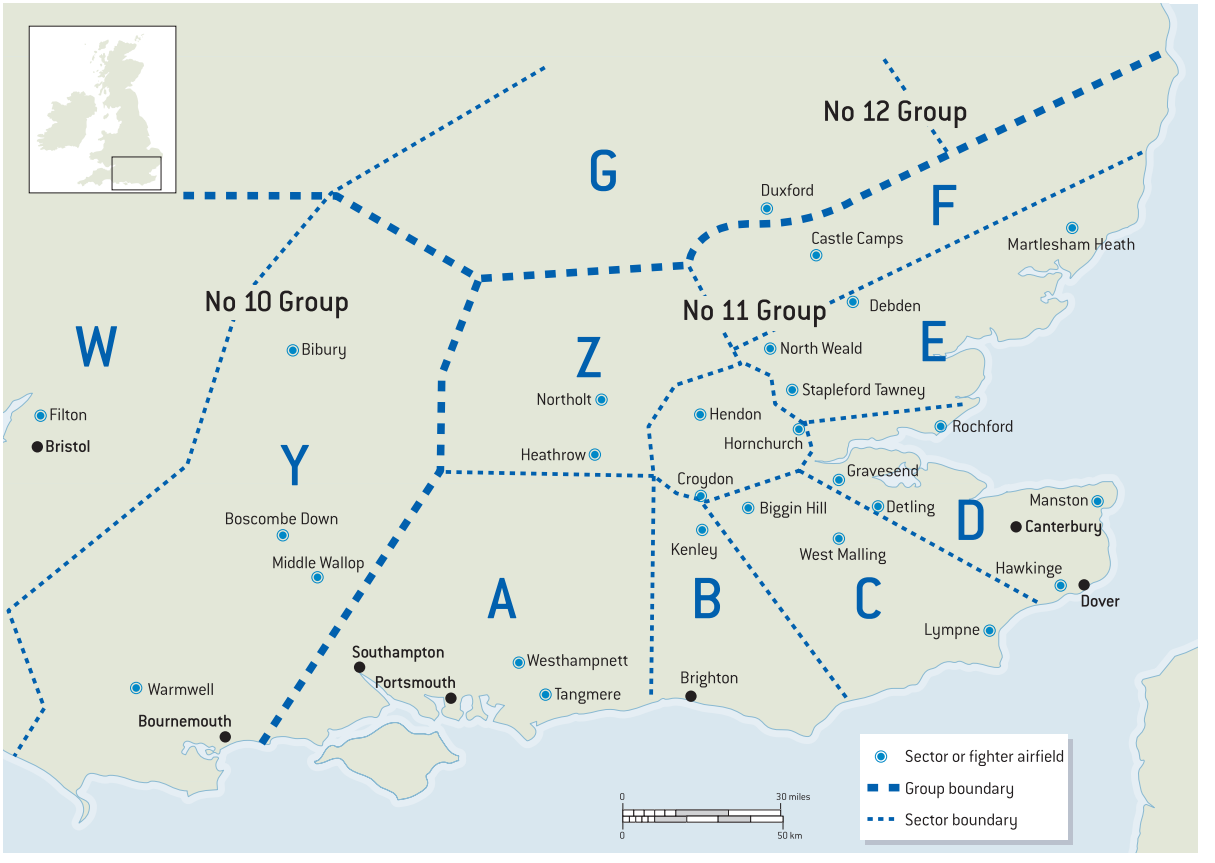
'Well', I answered, 'at first I was tingling all over with excitement, but when after time nothing happened, I was damn bored.'

'To my way of thinking', piped up [Plt Off] George Gribble, 'it was a waste of time flying so high and only along the coast. Why the hell didn't we go inland a bit. That way, we might have stirred up some trouble?'

A general discussion now followed on the tactics to be used on the next show, and it was agreed that despite the necessity to conserve fuel for the patrol area, we should fly a little faster on the way out. As [Flg Off B H] 'Wonky' Way so aptly put it, 'We were going so slowly that I felt as if I was resting my bottom on the section below me.'

Although this trip marked the commencement of what was to be an intensive period of offensive operations, the nearness of the newly acquired Hun air bases put a greater emphasis than ever on the air defence of our own shores. This meant maintaining a high state of readiness by those squadrons [predominantly equipped with Spitfires] not operating over northern France, with the result that as soon as we landed and refuelled, we reverted to the now boring task of keeping pilots in cockpits ready for immediate take-off.

For the next seven days the squadron alternated between long periods of readiness both by night and day, and patrols in the Calais/Dunkirk area. On each successive trip we penetrated a little further inland, and as our confidence grew we flew longer and lower in the hope that the Huns would see us and give battle. But to no avail.



RAF Fighter Command sector and fighter airfields in southeast and southern England during the Battle of France and Operation *Dynamo*. The Spitfire units involved in the fighting in May–June 1940 flew exclusively from airfields controlled by No 11 Group, with Hornchurch being home to the majority of those squadrons. Missions were also generated from Manston, which was used as a forward operating airfield for Biggin Hill-based No 610 Sqn, Northolt, Martlesham Heath (the latter being Duxford's forward operating airfield) and Rochford (Hornchurch's forward operating airfield).

Indeed, the Spitfire's only victory in the eight days following the initial engagements by No 66 Sqn was a Ju 88 downed near Flushing, in Holland, by No 65 Sqn during the morning of 17 May. This would change from the 21st, when RAF Fighter Command was called upon to defend British and French troops retreating to Dunkirk and Calais. That day, 142 RAF fighters flew 14 patrols, during which they attempted to protect Allied warships from formations of unescorted German bombers. No 74 Sqn saw plenty of action, making eight claims for the loss of a Spitfire forced down on the beach at Berck-sur-Mer when its pilot ran out of fuel.

During the final patrol of the day, Spitfires from Nos 64 and 610 Sqns fought a series of inconclusive engagements with Ju 88s and Bf 110s that used cloud cover to make good their escape. No 610 Sqn claimed a solitary victory, although this turned out to be a Blenheim IV from No 18 Sqn – it crash-landed on the French coast.

With the Battle of France all but lost, action for RAF Fighter Command would now take place almost exclusively near Dunkirk, Calais and Boulogne-sur-Mer. Protecting the evacuation ports and beaches from enemy bombers would severely test the RAF's Spitfire units, as pilots were patrolling many miles from home over the sea and often out of radar and radio range. Due to the Spitfire's modest endurance, operating times over the French coast were extremely limited. The Luftwaffe knew this, and frequently sent in large

formations of bombers just as the RAF pilots were on the verge of having to return to England.

Typically, the Spitfire and Hurricane units were also comprehensively outnumbered by the German bombers and their Bf 109 and Bf 110 fighter escorts (the latter also usually enjoying a height advantage). In an effort to counter this, RAF Fighter Command decided that squadrons would be sent over in 'wing' strength. This did not mean that they would operate as a single cohesive unit, however, for RAF fighter squadrons had not been trained to fly in such large formations. Once off the French coast, units invariably split up and did their own thing for there was no wing leader in overall command.

The RAF's first Spitfire aces (and a bugler) raise their side caps in salute to HM King George VI following their receipt of DFCs and a DSO at Hornchurch on 11 June 1940. These pilots are, from left to right, Plt Off Johnny Allen of No 54 Sqn, Flt Lts Bob Tuck (No 92 Sqn), Al Deere (No 54 Sqn) and 'Sailor' Malan (No 74 Sqn), all of whom were awarded DFCs, and Sqn Ldr James Leathart (No 54 Sqn), who received a DSO. All five aviators were heavily involved in the early Spitfire actions over northern France in May–June 1940, making 48 claims between them. (Author's Collection)

Despite these problems, Nos 54, 65, 74 and 92 Sqns made 85 claims between them in the four days leading up to the commencement of Operation *Dynamo* – the evacuation of the BEF from France – on 26 May. Future high-scoring Spitfire aces Plt Offs Al Deere and Colin Gray of No 54 Sqn, Flt Lt 'Sailor' Malan and Plt Off John Freeborn of No 74 Sqn, and Flt Lt Bob Tuck and Plt Off Alan Wright of No 92 Sqn were all credited with their first victories during this period of intense action. These successes came at a price for the quartet of Spitfire squadrons, with 15 aircraft being shot down, five pilots killed and five captured. A number of the losses were inflicted by Bf 109Es, as the RAF's premier fighter was pitted against an enemy machine of equal performance for the very first time.

The first large-scale clashes between the two types had occurred on the morning of 23 May, when both Nos 54 and 92 Sqns engaged Bf 109s near Calais-Marck and Boulogne-Dunkirk. The Spitfire pilots in combat that day were amongst the most highly trained aviators to see action in World War II. Many were veteran career officers or NCO pilots, while others were well-trained civilian pilots who had seen several years of pre-war service with auxiliary units or were long-standing members of the RAFVR. However, as noted earlier in this volume, they did not have combat experience, and the tactics they had been tasked with employing left a lot to be desired. Nevertheless, the Bf 109 pilots certainly came off worst in the opening encounter with their counterparts in Spitfires.

Overclaiming was rife amongst RAF Fighter Command units throughout World War II, and a perfect example of this can be seen in the victory tally for 1100–1130 hrs on 23 May. Five Bf 109s were confirmed as destroyed and eight more remained unconfirmed destroyed. In reality, four Bf 109s (two from 1./JG 1 and two from 1./JG 27) had been lost. In return, the Luftwaffe pilots involved had claimed three Spitfires destroyed – two were in fact lost.

Plt Off Tony Bartley of No 92 Sqn fought in a number of key engagements with the unit over Dunkirk that saw him make eight claims. Awarded a DFC in October 1940, he ended the war with 12 and 1 shared victories to his name. (Author's Collection)

Plt Off Tony Bartley of No 92 Sqn was credited with one of the German fighters that had been confirmed as destroyed, and he wrote about this action in his autobiography *Smoke Trails in the Sky*:

> Twelve Rolls-Royce Merlins roared in unison with 12 fighter pilots crouched in their cockpits alone with their thoughts. This was the day, the hour, the moment of truth. The BEF was retreating towards the Channel ports, deserted by their French allies.
>
> I watched the aeroplane of my flight commander, [Plt Off] Paddy Green, ahead of me, and repeated his last instruction to myself: 'Stick to my tail and for God's sake keep a lookout behind.'
>
> I had no feeling of fear, just the intense excitement before any contest. The fact that this was to be to the death didn't cross my mind. I looked down at Cap Gris-Nez and up at the dark surround of smoke which hung predatorily above it from a source on earth.
>
> Then, 'Look out, 109s', someone yelled over the intercom, and almost simultaneously I saw one. It was blue-grey and evil-looking with its large black crosses. So, this was it … and as I started after him, I wondered if this was his first combat, as it was mine? If he felt as I did? If he had once loved to fly in peace, rolling and looping in the towering cumulus, high up and alone in clear blue skies? I wondered how soon he would spot me closing in on him, or whether I could take him unawares?
>
> Then suddenly he turned in a tight circle, but I turned tighter. I saw him crouched in his cockpit, looking back at me as I held him in my gunsight and pressed the trigger of my eight machine guns. I saw the flash of my bullets as they struck his wings and tailplane. Then, I heard the bullets thudding into me and saw his compatriot whizz past. I'd forgotten Paddy's warning to look behind me.
>
> I was angry now, and prepared for a second attack when Paddy's aircraft suddenly appeared in front of me. He hit 'my' 109 with a long burst of fire, and an aileron flew off and fluttered earthwards like an autumn leaf. The aircraft flick-rolled, then spewed out its pilot. I was close enough to see his helmet fly off, and white face and blonde hair streaming grotesquely. He didn't pull the rip cord. My petrol gauge was showing next to zero, so I radioed Paddy and dived towards the ground. I saw the blazing wreck of a Spitfire as I darted seawards over the beach. It was [Plt Off] Pat Learmond's aircraft – the squadron's first war casualty.
>
> I made Hornchurch with only a few gallons to spare, and as I climbed out of my cockpit, my head ached from the smell of cordite and my heart was hammer-pounding. Some of the others had already landed and were giving their Combat Reports to the Intelligence Officer. Others were in the circuit. So this was what it was all about, I thought to myself, as I walked wearily towards our dispersal hut.

While No 92 Sqn was taking on Bf 109s for the first time, Plt Offs Al Deere and Johnny Allen were fighting for their lives over Calais-Marck airfield – a detailed description of this action is featured in Chapter 1. Unlike the standard Spitfire Is flown by No 92 Sqn, both of the No 54 Sqn aircraft were fitted with Rotol RX5/1 three-bladed constant-speed propellers. Deere was fulsome in his praise of the latter in the wake of this action:

Spitfire I P9372 was delivered new to No 92 Sqn in March 1940, and the aircraft is seen here being put through its paces by Plt Off Tony Bartley shortly after its arrival at Hornchurch. He would later fly the fighter in combat over northern France and during the Battle of Britain. P9372 was shot down on 9 September 1940, crashing near East Guldeford, near Rye, East Sussex. Its remains were recovered 30 years later, and the fighter has recently been undergoing a restoration to airworthiness (accurately painted in its *Dynamo* scheme) by the Biggin Hill Heritage Hangar. (Author's Collection)

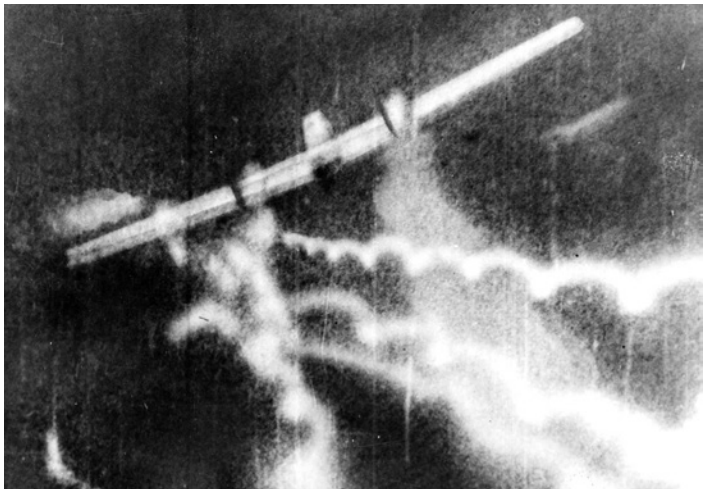
As a result of my prolonged fight with the last Me 109 [on 23 May 1940], it was possible to assess the relative performance of the two aircraft. My abiding memory was the thrill of the action – there was no sense of danger at that early stage in the war; so much so that I stayed behind the second of the two Me 109s that I encountered after I had run out of ammunition just to see if I could do so. I only broke off when petrol became a factor. My prolonged fight with this Me 109 allowed me to assess the relative performance of the two aircraft.

In early engagements between the Hurricane and Me 109 in France, the speed and climb of the latter had become legendary, and were claimed by many to be far superior to that of the Spitfire. I was able to refute this, and indeed was confident that, except in a dive, the Spitfire was superior in most other fields, and was vastly more manoeuvrable. My superior rate of climb was, however, due mostly to the type of Spitfire with which my squadron was equipped. We had the first Rotol constant-speed airscrews on which we had had been doing trials when the fighting started. Other Spitfires were, at that stage, using a two-speed airscrew (either fully fine pitch or fully coarse), which meant they lost performance in a sustained climb. The constant-speed unit changed its pitch as the engine revs went up.

There was a great deal of scepticism about my claim that the Spitfire was the superior fighter. There were those who frankly disbelieved me, saying that it was contrary to published performance figures. Undoubtedly, a Me 109 in the hands of a good pilot was a tough nut to crack, but the big thing for me was that we shouldn't have any fear of the aircraft in combat.

During No 92 Sqn's second patrol of 23 May, its pilots attempted to attack 15–20 enemy bombers targeting Allied shipping in Boulogne harbour. However, approximately 30 Bf 110s of I./ZG 26 and II./ZG 76 intervened, attacking the Spitfires from above – with devastating results. Again, Plt Off Tony Bartley was in the thick of the action:

After adding up scores of confirmed and probably destroyed [from the morning patrol] and patching up bullet holes, the squadron took off again in the afternoon and ran into the enemy as soon as we reached the beaches. A swarm of Heinkels [at 8,000–10,000ft] approached like a gaggle of grey geese. Just above them, their close escort of countless Me 110s, and higher still a swarm of 109s, small specks which betrayed their presence by their contrails in the sky.



This photo-reconnaissance Bf 110 was shot down over the Channel by No 74 Sqn's Flt Lts 'Sailor' Malan and 'Paddy' Treacy on the morning of 24 May 1940. Both pilots had camera guns fitted to their aircraft that day, and this frame was taken from the footage shot by Treacy. His Combat Report stated, 'Do 17 [it was, of course, a Bf 110] sighted near Calais and Squadron gave chase. F/Lt Malan led attack and disabled enemy, setting starboard engine on fire. I closed in and fired 5 seconds burst into port engine which caught fire and enemy crashed.' (Andy Saunders Collection)

I didn't know how [Sqn Ldr] Roger [Bushell] proposed to attack the armada, and I thought of Henry V at Agincourt, perhaps because it was not far from us. Suddenly, Roger's voice broke R/T silence.

'Paddy, your flight take on the top cover. The rest, stick with me, and we'll take on the bombers.'

I stuck to Paddy's tail as he scrambled for more altitude [the Spitfires were at 4,000ft]. All of a sudden we were in the middle of a milling mass of Me 110s. I turned in behind the closest of them. He had a shark's jaw painted on his nose. I saw his rear gunner's tracer bullets reaching for me and then stop abruptly as I took aim and fired my first burst from my eight machine guns. On my second, he lurched, flipped over on his back and started to plunge towards the ground, both engines on fire.

The 110s had formed into a defensive circle, with the Spitfires wheeling and shooting inside it, picking their targets, one after the other. The rear gunners fired back, the sky filling with tracer – a veritable maelstrom of whizzing bullets. I crouched lower in my cockpit to make myself as small a target as possible, tacked on to another 110 and fired the rest of my ammunition into him at about 50 yards' range. I couldn't miss, and again I saw the engines start to smoke, then burst into flames as he broke away from the circle.

As I ducked out of this aerial arena since there was no more that I could contribute, and I had felt several ominous thuds in my fuselage, I heard Roger 'whoopying' on the intercom that he had got one, and was after another, then, minutes later, cussing that some bastard in a Me 110 had got him.

As I was racing back across the Channel, another Spitfire flew up beside me, and the pilot pulled back the hood and started pointing at my aircraft. Then, [Flt Lt] Bob Tuck came on the intercom and chortled, 'You look like a sieve, chum. Better stick your arms out and start flapping'. I scanned his fuselage and answered

The victors and the vanquished. No 92 Sqn Spitfire I P9374 was shot down by return fire from a Do 17 on the morning of 24 May 1940. Its pilot, Flg Off Peter Cazenove, belly-landed on a beach near Calais and was captured, while his aircraft slowly sank into the sand. It remained there until uncovered by strong tides in 1980, the fighter eventually being restored by the Aircraft Restoration Company at Duxford in 2006–2011. (Author's Collection)

back, 'Just wait until you get a look at your crate.' We escorted each other, more slowly, back to Hornchurch. When we had landed, we discovered that Roger, [Flg Off] John Gillies, the famous plastic surgeon's son, and Sgt Paul Klipsch were never to join us again.

Paddy Green had landed at Hawkinge [in Kent], his cockpit awash with blood. He'd been hit in the thigh with an armour-piercing bullet. But according to the pilots' claims of confirmed, probables and damaged, we'd knocked out an awful lot of Luftwaffe aircraft, and I myself had witnessed very many tumbling towards the ground. We reckoned that we were a very long way ahead of our losses.

However, despite No 92 Sqn claiming seven Bf 110s destroyed and six unconfirmed destroyed, not a single *Zerstörer* was in fact lost. Three returned to base damaged but repairable.

Hornchurch-based Nos 54, 65, 74 and 92 Sqns remained committed to operations on 24–25 May, with all four units flying multiple patrols on both days, notwithstanding their ranks being progressively depleted with each mission. Invariably, the surviving pilots flying patched-up Spitfires would encounter ever-larger formations of bombers escorted by 'swarms' of Bf 109s and Bf 110s.

1800 hrs, 23 MAY 1940

EAST OF BOULOGNE

1 Twelve Spitfire Is of No 92 Sqn are tasked with patrolling above the beaches of Boulogne–Calais–Dunkirk at 4,000ft. Flying in Battle Formation (three 'vics' of three), the unit is led by Sqn Ldr Roger Bushell.

2 As soon as No 92 Sqn reaches the French coast, Bushell spots 15–20 Ju 88As at 8,000–10,000ft. Above them are 30+ Bf 110Cs (from I./ZG 26 and II./ZG 76) flying close escort, with a smaller number of Bf 109Es higher still performing top cover.

3 Despite being totally outnumbered, Bushell orders Flt Lt C P Green to climb up and engage the Bf 110Cs with his flight of six Spitfires, while the remaining six pilots follow their CO in an attack on the bombers.

4 The climbing Spitfires meet Bf 110Cs from II./ZG 76 head-on.

5 A number of Bf 110Cs from I./ZG 26 manage to down three Spitfires in their first pass, preventing Bushell's 'vics' from reaching the bombers, while Green's flight engages aircraft from II./ZG 76. The Messerschmitts from the latter *Gruppe* quickly form a defensive circle, offering each other mutual protection from the front and the rear. Undeterred, the Spitfire pilots wheel in and out of the circle, conducting slashing attacks.

6 Plt Off Tony Bartley manages to get onto the tail of a Bf 110C, exchanging fire with the aircraft's rear gunner until the latter falls silent and the fighter dives away trailing smoke.

7 Bartley then goes after another circling Bf 110C, his Spitfire being hit multiple times while he is chasing his quarry. He fires his remaining ammunition into the aircraft from just 50 yards and the Messerschmitt also drops out of the defensive circle with smoking engines.

8 Damaged by return fire and having exhausted his ammunition, Bartley heads for home. Racing across the Channel, he is joined by squadronmate Flt Lt Bob Tuck, whose Spitfire has also been shot up.

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Operation *Dynamo*

Just hours after the capture of Calais by German forces on 26 May 1940, Prime Minister Winston Churchill ordered that the evacuation of Allied troops was to commence in earnest from Dunkirk in an operation codenamed *Dynamo*. The Royal Navy had started planning for this difficult undertaking six days earlier, gathering ships at the Kentish port of Dover for the evacuation. It would be up to RAF Fighter Command to 'Ensure the protection of the Dunkirk beaches [three miles on either side] from first light to darkness by continuous fighter patrols in strength.'

Up until their capture, Boulogne-sur-Mer and Calais had been the principal targets of the Luftwaffe. RAF Fighter Command had done its best to protect troop-laden ships escaping from both ports, with Nos 54, 74 and 92 Sqns claiming a handful of victories and incurring several losses defending Boulogne-sur-Mer, Calais and Gravelines in the 48 hours prior to the commencement of *Dynamo* and the first sustained aerial attacks on Dunkirk.

On 26 May, Nos 54 and 65 Sqns were joined in combat for the first time by No 19 Sqn, which intercepted Ju 87s targeting shipping off Calais and claimed seven Stukas and two escorting Bf 109s destroyed – the unit was credited with a further three Messerschmitts shot down during a second patrol that same day. These successes added to seven victories awarded to No 54 Sqn and seven to No 65 Sqn for the loss of six Spitfires (four of them from No 19 Sqn). The fierce nature of the fighting on this date would continue through to the end of *Dynamo* on 4 June.

Like the handful of Spitfire units that had been involved in the fighting over France since 21 May, No 19 Sqn experienced the harsh reality of aerial combat when it was first committed to protecting the Dunkirk evacuation on the morning of 26 May. The unit had been posted down from its long-standing home at Duxford to Hornchurch on the evening of 25 May to replace the remnants of No 92 Sqn. According to Plt Off Tony Bartley, that day No 92 Sqn 'could only field one flight [six aircraft] on account of our missing [five lost and one wounded] pilots and bullet-riddled aircraft'.

Following one last patrol, the unit was sent signals from Air Vice-Marshal Keith Park, Commander-in-Chief No 11 Group, and Air Marshal Dowding. 'Both congratulated 92 Squadron pilots on a magnificent performance', recalled Bartley. 'The Station Commander then told us we were leaving for Duxford forthwith to put a new team together under a newly appointed CO.' No 92 Sqn would return to the fray on 2 June, flying one last *Dynamo* mission from Duxford's forward airfield at Martlesham Heath, in Suffolk.

Plt Off Walter Lawson, Flt Lt Brian Lane and Flt Sgt George Unwin participated in most of No 19 Sqn's forays across the Channel to the evacuation beaches, and the latter two pilots made nine claims between them. Lane routinely led the unit after its pre-war CO, Sqn Ldr Geoffrey Stephenson, was shot down in Spitfire I N3200 on the morning of 26 May 1940 – No 19 Sqn's very first day in action. This photograph was taken at Fowlmere, in Cambridgeshire, during the height of the Battle of Britain. (Author's Collection)

Spitfire I N3200 of No 19 Sqn became something of an attraction for German troops on the beach at Sangatte, as this photograph clearly shows. Sqn Ldr Gordon Stephenson had made a textbook wheels-up landing in the fighter after its radiator had been holed by return fire from a Ju 87 of 3./StG 76. Prior to his fighter being hit, the CO of No 19 Sqn had downed a Stuka – note the fabric covering over the fighter's gun ports has been shot away. (Peter R Arnold Collection)

Meanwhile, at Hornchurch, No 19 Sqn was enduring something of a baptism of fire. The unit flew two patrols on the 26th, with the first mission involving all 12 of its aircraft on a morning sweep of the beaches at Dunkirk. Sqn Ldr Geoffrey Stephenson led the way, with one of the pilots in his section, Plt Off Michael Lyne, recalling seeing 'columns of black smoke from the Dunkirk oil storage tanks'. Although nothing was initially found in the immediate area, according to No 19 Sqn's Intelligence Report for the mission, '18 Junkers 87s in vics of three were eventually sighted spread over the sky. Ahead of them and above were 30 Me 109s in seven vics of five.'

Lyne explained that 'Geoffrey Stephenson aligned us for an attack in sections of three on the formation of Ju 87s. As a former CFS [Central Flying School] A1 instructor, he was a precise flier and obedient to the book, which stipulated an overtaking speed of 130mph. What the book never foresaw was that we would attack Ju 87s doing just 130mph.' Stephenson soon realised that his squadron was closing way too fast on the dive-bombers, and after initially calling for his pilots to be ready to attack, he then told his section of three to throttle back.

'We were virtually formating on the last section of Ju's at an incredibly dangerous speed in the presence of enemy fighters', noted Lyne, 'and behind us, the rest of the squadron were staggering along at a similar speed.' Stephenson and his two wingmen targeted the last section of Stukas and then broke away, leaving the Ju 87s to scatter too, chased by the nine Spitfires behind the lead section. The dive-bombers' fighter escort then joined the action. One of the pilots to be targeted by the diving Bf 109s was Flt Lt Brian Lane, who, minutes earlier, had downed a Ju 87 during his first clash with the enemy. He recounted his scrap with the Messerschmitts in his wartime autobiography, *Spitfire*:

> There weren't many Stukas left now, but [Flg Off] Eric [Ball] turned and tried to hold off the German fighters, Me 109s, while we completed the rout. But before we could complete the job the 109s were down on us. A burst of tracer came over my left wing and I turned violently as a grey-painted shape with black crosses on it flashed past. I saw the pink blur of the pilot's face turned towards me as he passed, and then another darker shape, only yards in front of my airscrew, flashed after him. It was a Spitfire after the 109.

To my left I saw [Plt Off P V] Watty [Watson] hot on the tail of a Hun. As I watched, I saw another Me 109 get on Watty's tail. I switched on my transmitter and yelled a warning to him, at the same time turning to try and get the Hun off him. Even as I did so, I saw a flash on the Spitfire as a cannon shell hit it. The Spitfire went into a steep dive, smoke pouring from the engine. I circled and saw a white puff as a parachute blossomed out far below [Watson, who was badly wounded, died in captivity on 28 May].

The noise of the machine gun firing behind me suddenly reminded me that I was still in the game, and I found that three Messerschmitts were honouring me with their undivided attention. An awful feeling gripped the pit of my stomach. I knew I had very little ammunition left, probably only enough for one burst, and three-to-one wasn't so funny. I pulled round in a tight turn, the aircraft shuddering just above the stall. I knew I could out-turn the 109s, but I had very little petrol to play with now, as well as being short of ammunition. Obviously it was time to go home!

The leading 109 was firing short bursts every now and then, his tracer going behind me as he strove to get his sights ahead far enough to hit me. I remember I was cursing at the top of my voice. I was in a jam, I was frightened, and I was furious at those Huns for making me frightened. Something had to be done, and done quickly. I tightened the turn still more. The aircraft flicked as she stalled. I rolled over on my back and out into the reverse turn – a trick I had learnt back at the FTS. This manoeuvre temporarily got me away from the Huns, and I dived hell for leather towards the sea, flattening out as near to the water as I could and then opening the throttle wide.

I was beginning to breathe again when I heard 'rat–tat–tat' behind me and tracer appeared over the cockpit, the bullets churning up a patch of foam in the water a hundred yards ahead. It was then that I remembered the automatic boost cut-out, a device giving maximum power [for five minutes] from the engine for use in an emergency. I pushed the throttle 'through the gate' and felt the surge of power from the Merlin in front of me as the aircraft accelerated. Twisting and turning, I managed to keep clear of the Hun bullets, very nearly hitting the water several times while doing so. One of the 109s had evidently climbed up to one side and now came diving in at me from the beam. I turned towards him and gave him the last of my ammunition at point-blank range. I think he went straight in, for as I drew well away with my superior speed I could see only two Messerschmitts behind me.

At last I saw the white cliffs of Dover, never a more welcome sight than now, and feeling sick and rather limp I throttled back, climbed up to clear the cliffs and flew on to the aerodrome.

Although Lane had made it back to Hornchurch, his CO, Sqn Ldr Stephenson, and Plt Off Watson, had been shot down and captured. According to Flt Sgt George Unwin, Stephenson, lacking modern combat experience, 'flew exactly by the [pre-war] book – and was, in effect, shot down by it'. Flg Off Ball had also been lightly wounded in the forehead and arm, and he told his squadronmates, 'I thought I was dead. Then I saw some more tracer coming past me, so I came to the conclusion I must be alive.'

At 1440 hrs No 19 Sqn sent nine Spitfires off for the unit's second Calais–Dunkirk patrol of the day, this time led by Flt Lt Lane, who was now acting

CO. Having missed out on the morning mission, Flt Sgt Unwin took part in this operation, but things did not quite go to plan for him:

> I had been keyed up and raring to go throughout the Phoney War, and having four years of service flying behind me, I felt totally confident in my ability to meet any challenge, particularly with the Spitfire as my mount. Despite feeling confident of my chances once combat was joined, I froze solid in my cockpit when the first Me 109 attacked me. I could see this aircraft diving down in an arc towards me, and all I could do was sit there in the cockpit and watch him, I was so fascinated! I was shaken from my stupor when two shells hit my aircraft behind the cockpit, forcing me to take evasive action. Fortunately, I survived this brief moment of 'stage fright' and never hesitated again – many pilots new to combat had similar experiences but never lived to tell the tale.

No 19 Sqn, 'flying in the inflexible and outdated formation of "Vics of three"' according to Plt Off Lyne, had been bounced by Bf 109s from 1./JG 2 east of Calais, resulting in Sgt C A Irwin being swiftly shot down and killed. Lyne was also forced to fight for his life, before eventually landing on Walmer beach seriously wounded.

The following day, 27 May, in a portent of what was to come during the Battle of Britain, the first large-scale clashes between RAF Fighter Command and the Luftwaffe took place when the latter unleashed 300 bombers, protected by Bf 109 and Bf 110 units that flew a total of 550 sorties between them. No fewer than 15,000 high explosive and 30,000 incendiary bombs were dropped on Dunkirk and evacuation vessels offshore. In response, No 11 Group generated 22 patrols during the course of the day.

The Campaign in France and the Low Countries, published post-war by the RAF Air Historical Branch, contained the following summary for the day's operations, which were typical for *Dynamo*:

TIGER ROARS

During the morning of 27 May 1940, No 74 'Tiger' Sqn, led by Flt Lt 'Sailor' Malan, patrolled the evacuation beaches as Operation *Dynamo* entered its second day. Amongst the pilots involved in the mission was Plt Off Johnny Freeborn, who had made three claims in the previous six days. His Combat Report for the action that ensued read as follows:

'I was Red 2 on offensive patrol Calais–Dunkerque at various heights from 200–15,000 feet owing to cloud formations. Sighted four Me 109s at 12,000–15,000 feet, Red 1 [Flt Lt Malan] ordered section break in pairs. I attacked with Red 4 [Plt Off P C F Stevenson]. Attacked second Me 109 from line astern, followed through cloud, firing several bursts at 200–150 yards range. Observed my fire to be effective, tracer entering fuselage. E.A. broke away left with very heavy black smoke and flame coming out of the engine.'

Having despatched a Bf 109E (probably from I./JG 1), Freeborn then hunted down another Messerschmitt after shaking off three others. His second success was achieved following a chase at very low level (five feet), Freeborn stating that his quarry tried to fly him into obstacles. 'I followed and gave him several short bursts. E.A. hit a field at 300mph and I saw him fly again for 1,000 yards. He then flew into a telegraph pole in the next field and into a farmhouse.'

FOLLOWING PAGES

ZPO

A morning patrol on 26 May 1940 that saw No 65 Sqn become embroiled in a swirling dogfight with more than 50 Bf 109s and Bf 110s off Calais. Having despatched a Bf 109 with veteran Spitfire I K9912, Plt Off Ken Hart quickly found himself being targeted by another Messerschmitt. His fighter was hit hard in the starboard wing by an exploding cannon shell, forcing Hart to crash-land on a beach west of Dunkirk. Upon extricating himself from K9912, Hart, as instructed, set fire to the Spitfire and eventually found his way back to England by boat on 28 May. (Author's Collection)

The most extreme efforts were now being made by Fighter Command to cover the Dunkirk area. During the first half of the day, however, other demands had also to be fulfilled, such as escort to bombers, patrols for the benefit of the Belgian front and protection for Calais (for it was not known that our garrison there had ceased fire). The patrol line covered in the morning most frequently was Calais–Dunkirk, but from 1450 hrs onwards Calais was no longer incorporated, and it became possible to concentrate fighter protection more exclusively for the benefit of the evacuation. The lines now adopted were, primarily, Gravelines–Furnes and, secondarily, a more inland route, Dunkirk–St Omer, or Furnes–St Omer.

The various patrol lines were (apparently on direct orders from the Air Ministry) covered, as far as the 16 squadrons engaged on the task could accomplish it, from 0500 hrs to 2130 hrs. This meant that nearly all patrols were perforce at no more than squadron strength; the strongest, in fact, apart from a two-squadron patrol over the Belgian front in the morning, consisted of 20 aircraft, and the weakest of nine aircraft. More squadrons carried out two patrols, and two squadrons – Nos 19 and [Hurricane-equipped] 213 – carried out three patrols. Only the Hurricanes were sent over the more inland patrol lines.

These patrols repeatedly encountered hostile forces throughout the day – in general, of a size permitting combat on not too unequal terms, but on occasion so large that our fighters were considerably outnumbered. At 0900 hrs, for instance, 11 aircraft of No 74 Sqn engaged some ten Do 17s and 20 Me 109s near Dunkirk. At 1900 hrs, 20 aircraft of Nos 56 and 610 Sqns, attacking a single He 111, observed the bomber fire signals which brought 30–40 Me 110s down upon them.

Despite these odds, the losses inflicted by our squadrons on the enemy probably greatly exceeded those suffered by themselves. In all, a total of 17 Spitfires and Hurricanes failed to return from the 289 sorties of the day, while the claims of enemy aircraft definitely destroyed amounted to 18 bombers, 19 fighters and one army co-operation machine, in addition to others probably destroyed and damaged [19 German aircraft, in total, were in fact downed].

To what exact degree our patrols limited enemy air activity in the Dunkirk area is very difficult to say. We know that Dunkirk port and town received its most serious damage on this day – so much so that the authorities there concluded, wrongly as it turned out, that the evacuation from the port would be impossible. We also

The charred remains of No 54 Sqn Spitfire I N3180 on the beach at De Panne, in Belgium, on 28 May 1940. The fighter was assigned to Plt Off Al Deere, and he had made ten claims (including seven victories) with the Spitfire prior to it being hit by return fire from a Do 17 during an early morning patrol. The aircraft caught fire after he force-landed on the beach, and an unconscious Deere (who had knocked himself out, probably on the gunsight, as the Spitfire rapidly decelerated upon hitting the sand) had to be dragged clear by a soldier. (Author's Collection)

> know that attacks were delivered against Dunkirk, or the shipping approaching and leaving it, on at least a dozen occasions. All that can be said is that, on May 27th, Dunkirk was severely and repeatedly bombed; that evacuation arrangements were most adversely affected; and that our fighters, successful as they were in inflicting greater losses than they suffered, were unable to prevent these occurrences.

Spitfires from five units had been involved in an exhaustive day of patrolling, with No 610 Sqn experiencing its first action during *Dynamo*. Of the 53 confirmed victories credited to RAF Fighter Command on the 27th, 24 of them were claimed by Spitfire pilots.

As the evacuation got into full swing, so the Luftwaffe's attempts to stop the 'Miracle at Dunkirk' increased in their ferocity. Ever-larger numbers of Ju 87s, Ju 88s, Do 17s and He 111s targeted the massed ranks of the BEF patiently queuing on the beaches and along the harbour mole, sinking numerous vessels attempting to carry the soldiers to safety. Poor weather on 28 May saved soldiers and sailors from the battering they had received the previous day, and only six German aircraft were credited to four Spitfire units – one of which was No 616 Sqn, making its operational debut from Hornchurch.

On its first day of flying from the Essex fighter base, the unit undertook no fewer than five patrols. Three of these were sweeps flown in conjunction with other Hornchurch-based Spitfire units (Nos 19 and 65 Sqns, with No 610 Sqn flying from Biggin Hill/Manston). During the course of these missions, No 616 Sqn was credited with two Bf 109s destroyed for the loss of a single aircraft, whose pilot was rescued. A further four Spitfires suffered light damage. Two more Bf 109s were claimed by No 19 Sqn's Flt Sgts Harry Steere and George Unwin, who, at that point, had more operational hours on Spitfires than virtually any other pilots in RAF Fighter Command. They would use this experience to claim 13 Bf 109s destroyed between them through to the end of November 1940.

'The weird thing about shooting down aircraft was that you never thought about actually hurting the occupant', Unwin explained to the author in 1995

No 610 Sqn saw action for the first time over France on 21 May 1940, and it continued to undertake patrols over the evacuation beaches from Biggin Hill and Manston through to the end of *Dynamo*. Many of those missions were led by Flt Lt John Ellis, who is seen here perched atop the engine of an appropriately marked Spitfire at Acklington, in Northumberland, after the unit had been posted north on 31 August 1940. A handful of the pilots surrounding the aircraft had also participated in the fighting over northern France. (Author's Collection)

'Rather, I concentrated on destroying the *aeroplane*. The horror of war only really struck home following a harrowing experience endured by my good friend Harry Steere when he and I each downed a Bf 109 over Dunkirk on the same mission [on 28 May]. The Messerschmitt had an L-shaped fuel tank precariously positioned immediately behind and below the cockpit seat, and once hit it soon burst into flames. The pilot of Steere's machine got halfway out of the cockpit before the flames engulfed him, all in sight of poor Harry. He was so shook up by what he had witnessed that he was physically ill during the return flight to Hornchurch.'

Having suffered telling losses since the start of *Dynamo*, and with surviving pilots struggling from fatigue due to the high mission tempo, RAF Fighter Command was forced to modify the continuous patrol policy it had adopted on 27 May. No 11 Group squadrons were given permission to 'operate stronger patrols, rather less frequently' according to *The Campaign in France and the Low Countries* summary for 29 May:

> From this day onwards, therefore, Fighter Command patrols were so arranged that up to four squadrons (though often in two separate formations) were on the Dunkirk patrol line at roughly the same time. It was rarely possible to muster a full 48 aircraft for these sweeps. The greatest number of aircraft on any one patrol on May 29th proved to be 44, and the smallest number, 25. Aircraft from 16 squadrons operated, and all patrols were concentrated within a radius of ten miles of Dunkirk.

Following cloudy weather in the morning, the clearing of the skies during the afternoon of the 29th allowed the Luftwaffe to return in force. Amongst the Spitfire units opposing the enemy aircraft during the afternoon was No 64 Sqn, which had flown in to Hornchurch from Catterick the previous day. It had sortied nine aircraft at 1650 hrs to patrol off Dunkirk, the unit joining No 610 Sqn (12 aircraft) and two Hurricane squadrons in a wing-strength formation numbering 40 fighters. The ensuing engagement fought by the quartet of units saw no fewer than five Spitfires and five Hurricanes downed by a larger number of Bf 109s that bounced the squadrons from above, resulting in the deaths of eight pilots (five of them from Nos 64 and 610 Sqns).

The attack by the high-flying Messerschmitts had been so successful that none of the enemy dive-bombers targeting Allied shipping off Dunkirk at that point were intercepted by RAF fighters. Five aircraft from I./JG 3 and III./JG 26 had been downed in return, with future ace Flt Lt John Ellis claiming his first success that day – he would be credited with the destruction of a further eight Bf 109s by the end of August:

> I was the leader of Blue Section consisting of two aircraft [unusually, No 610 Sqn was flying its Spitfires in pairs, rather than in vics of three] on a high-altitude [25,000ft] patrol from Dunkirk to Furnes. At 1735 hrs I sighted six Me 109s approaching head-on from the northeast and about 100ft above us. As soon as they had passed overhead, I broke my section away and Blue 2 [Sgt P D Jenkins] and myself engaged the leading pair. After a dogfight lasting roughly three minutes,

1740 hrs, 29 MAY 1940

DUNKIRK

1 Doing its best to defend the evacuation beaches, RAF Fighter Command sends out a large force of Spitfire Is and Hurricane Is to patrol over the coast of northern France in an attempt to keep Luftwaffe bombers away from Dunkirk. The wing-strength formation consists of 19 Spitfires (12 from No 610 Sqn and nine from No 64 Sqn) and 19 Hurricanes from Nos 229 and 242 Sqns. The Spitfires are at 25,000ft and the Hurricanes at 10,000ft.

2 In a textbook bounce, six high-flying Bf 109Es from III./JG 26 attack the RAF fighters while they are still in close formation, subsequently downing five Spitfires and five Hurricanes and killing eight pilots.

3 Having survived the initial bounce that killed two of their squadronmates, Flt Lt John Ellis and his wingman, Sgt P D Jenkins, bank sharply and head after the leading pair of Messerschmitts.

4 In a swirling dogfight that lasts three minutes, Ellis hunts down a Bf 109E and fires four full deflection bursts as his opponent desperately tries to shake off the tighter-turning Spitfire.

5 On his fourth, and final, burst, Ellis hits the Messerschmitt hard in the engine, which abruptly stops whilst the fighter is in yet another tight turn.

6 With its propeller stopped dead and black smoke pouring from a hole made in the top of the engine cowling, the Bf 109E stalls and then spins away just as the pilot bails out. Having run out of ammunition, Ellis returns home.

FOLLOWING PAGES

1
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during which time I fired four full deflection bursts, the engine of the 109 stopped suddenly in a tight turn, and the aircraft then stalled and spun violently. Black smoke was pouring out of a hole my bullets had made in his top engine cowling. The pilot bailed out just as my ammunition ran out, and I broke away. Seeing no sign of friendly or enemy aircraft, I returned home.

Nos 64 and 610 Sqn undertook a second patrol from 1955 hrs, although this time only 14 Spitfires were available to participate in the operation following the carnage of the previous mission. Again, No 610 Sqn suffered casualties, as Flt Lt Ellis recalled:

In the early evening we flew another patrol over Dunkirk [having reverted to vics of three]. We had only just arrived over the beaches at 12,000ft when we were fired on either by Royal Navy ships or from AA guns ashore. Sgt Jenkins, again my No 2, was immediately hit in his port wing, half of which was blown off. The aircraft went down inverted, and I saw Jenkins bail out.

As he was drifting out to sea, I decided to follow him down. He landed in the sea about two miles from a destroyer, which I flew over at nought feet towards the parachute in the sea. The only response from the destroyer was to open fire on me with Bofors guns. I approached four or five different destroyers and tried to attract their attention too, but was fired on by each one despite the fact I was flashing the letter of the day. I continued for some ten minutes flying from the destroyers to Blue 2 [Sgt Jenkins], but as they continued firing on me and did not alter course, and as my petrol was getting low, I returned home and left Jenkins to his fate. He was never seen again.

As Jenkins was an outstanding pilot, it was particularly tragic he should be lost in this way. At this stage of the war, the Army and Navy did not know the difference between a Spitfire and a Stuka!

Sqn Ldr [A L] Franks was also missing after this sortie. No one saw him go down, but later on we heard his body had been washed up on one of the small islands along the Dutch coast, where he is buried.

Nos 64 and 610 Sqns had had seven pilots killed (including the COs of both units) during the course of the day. RAF Fighter Command was discovering the hard way that its pre-war tactics, centred on inflexible three-aircraft 'vic' formations, were outdated, resulting in the loss of many valuable pilots. Those that survived (men like 'Sailor' Malan, Bob Tuck, Al Deere and John Ellis) quickly devised their own 'rules for air fighting' based on tactics that had been used successfully against them by Bf 109 units.

Dynamo's aerial action reached its climax on 1–2 June, when Spitfire units claimed 45 aerial victories (for the loss of 17 fighters) in just 48 hours. By then, Nos 41, 66, 72, 222, 266, 609 and 611 Sqns had also entered the fray, easing the burden on Nos 54, 74 and 92 Sqns, which had suffered telling losses in both men and materiel since being committed to the Battle of France ten days earlier.

On the 1st, No 19 Sqn led the way in terms of aerial success, with its pilots claiming ten victories during the course of two patrols – both in conjunction with Nos 41 (four victories), 222 (four victories) and 616 (three victories) Sqns.

Eight Spitfires were lost in return, while the Luftwaffe recorded ten losses. No 19 Sqn was led on both occasions by Flt Lt Brian Lane, who included the following account of the first patrol in *Spitfire*:

> [Having taken off from Hornchurch at 0445 hrs] I turned left round the 'drome, glancing in the mirror to see the rest of the squadron formed up behind me. Three circuits later, the other two squadrons were in position, S/Ldr M [H W Mermagen], 'Tubby' to everybody, immediately behind us [leading No 222 Sqn], and 'Robin' [Sqn Ldr H R L Hood] bringing up the rear with his squadron [No 41]. I straightened up and climbed away towards Dunkirk and the rising sun, circling as we left the English coast to pick up a fourth squadron [No 616] of Spitfires from another aerodrome [Rochford, in Essex] which had a rendezvous with us. Then out over the North Sea, 48 Spitfires looking for trouble!
>
> When we reached the Belgian coast, I turned left to run up to Nieuport, past the packed beaches looking oddly like Blackpool or Margate on a Bank Holiday, past hundreds of small craft lying offshore to ferry those heroic troops to bigger vessels standing farther out. Every kind of craft was represented there, Thames barges, lighters, rowing boats, lifeboats, in fact anything that would float. Stretching back towards the cliffs of England was an unending stream of ships, some taking precious loads from the hell beneath us now to the comparative peace and safety of our island, others returning in the opposite direction, back to the inferno to save some more of that undefeatable little army.
>
> From 5,000ft we watched the drama being enacted below us. Above was a thin layer of cloud, not more than 50ft thick, through which the sun was just visible. Suddenly, in front of us, appeared a twin-engined aircraft, followed by 11 more, all heading towards Nieuport. I switched on the R/T: 'Twelve Me 110s [from I./ZG 1] straight ahead', I said, then opened the throttle and gave chase.
>
> The Messerschmitts evidently saw us coming, for they went into a circle and tried to get into the clouds. For once the odds were in our favour, and four-to-one at that. I was still out of firing range when, to my astonishment, one of the enemy aircraft staggered and then plummeted down, down, with a strange pendulum motion as its tail came off. None of my section had fired, and since we were leading and out of range still, I could not imagine how on earth the Hun had been shot down.
>
> By now we had closed with the enemy, and turning right, I got on the tail of a Messerschmitt and chased him down as he dived away, the rest of the squadron fighting to get a target! It really was pathetic. By our standard of training, those pilots should never have left the FTS, yet here they were, trying to fight four times their number and with no idea how to do it. War is war, but I remember cursing the Hun for being a cold-blooded devil in sending out pilots like these to fight us. Even as I cursed I realised what a queer thought this was. We ought to be thankful for cold meat like this!
>
> I fired several bursts at the 110 I was after and saw his port motor splutter and stop. As he tried to turn away, I pulled round inside him and gave him another squirt, this time hitting his starboard engine, which was immediately enveloped in smoke. By this time we were pretty low, and as I pulled up I saw him go down into the deck.
>
> Looking round, I was in time to see the tail come off another 110, and down he went too. Since every Hun in sight had a Spitfire on his tail, I climbed up

This photograph of Australian pilot Flg Off I B N 'Hack' Russell of No 609 Sqn was taken at Northolt on 1 June 1940, immediately prior to him departing on his final, fatal, sortie. Having undertaken an uneventful patrol over Dunkirk, Russell was leading No 609 Sqn's Red Section home when, according to the unit's Operational Record Book, his aircraft (L1058) 'was attacked and hit by an Me 110 which dived through the cloud base above him. He pulled up violently and then went into a slow spiral glide with glycol streaming from his radiator.' No trace of Russell, who had just received the DFC for his exploits with both Nos 607 and 609 Sqns over France, was ever found. (Author's Collection)

through the clouds to see if there were any up there. As I came out on top, I saw two Spitfires cruising about. As any Me 110s came up through the cloud, they jumped on them, sending them down again. Unfortunately for those wretched Huns, the cloud was too thin to hide in – there was no escape. I came down again, and as an Me 110 came towards me head-on, I fired, then turned to come back after him. But another Spitfire was on his tail before I could get there. A few seconds later, a dull flash appeared on the ground below, followed by a huge tongue of flame.

After this, there didn't seem to be any more Huns left, so I dived down almost to the water and came home, where I found most of the aircraft already on the ground. Two more came in as I was landing, and the squadron was complete.

Initially, as Lane noted, just Bf 110s had been encountered, although Bf 109s from I./JG 26 eventually joined the melee. Nine *Zerstörer* were claimed destroyed by Nos 19 and 222 Sqns in an action that went a long way to dispelling the myth of invincibility that had grown up around the Bf 110. At least four Bf 109s were also credited to the Spitfire units as having been destroyed. The Luftwaffe recorded seven losses in total. Six Spitfires were downed, with two pilots killed and one captured (all three from No 222 Sqn).

Although *Dynamo* did not officially end until 4 June, the final large-scale aerial engagements were fought on the 2nd. That day, between 0430 hrs and 2100 hrs, the Luftwaffe launched at least 42 major raids on Dunkirk and shipping in the Channel. Nos 66, 92, 266 and 611 Sqn attempted to repel the heavily escorted bombers between 0700 and 0930 hrs, with No 92 Sqn's Operations Record Book subsequently noting:

> 92 Squadron again covered itself with glory over the French coast. It shot down 14 enemy bombers and four fighters without any loss to the squadron. It was a grand show. The squadron now has over 50 machines to its credit.

Plt Off Tony Bartley was one of a handful of aviators from No 92 Sqn who had been in the vanguard of the fighting over northern France since 23 May, making eight claims through to 2 June. Four of these came during the unit's final *Dynamo* patrol, as he explained in *Smoke Trails in the Sky*:

> We flew from Duxford to our forward base at Martlesham Heath, where two other squadrons [Nos 266 and 611] were stationed. We subsequently took off as a wing, 92 leading, led by [Flt Lt] Bob Tuck. It was a comforting spectacle to see a gaggle of

Flt Lt John Ellis (in DW-O/R6595) leads Sgt S J Arnfield (in DW-K/P9495) and, to Ellis's right, Flg Off W H C Warner (in DW-Q/P9502) during a patrol from Gravesend on 26 June 1940. Although the three Spitfires in the foreground had joined No 610 Sqn earlier in the month as attrition replacements for aircraft lost during *Dynamo*, the trio of pilots flying them had all experienced considerable action over the evacuation beaches. (Author's Collection)

36 Spitfires around me. Bob had briefed the wing to fly in loose formations [rather than in tight 'vics', thus illustrating the rapid implementation at squadron level of revised RAF Fighter Command tactics following recent combat experience]. The Hun was going to have a rude awakening, I was thinking.

We intercepted the enemy ten miles behind Dunkirk. The bombers were flying in their formations of three, and there were lots of them, but their fighter cover appeared quite a way off, for some reason. Bob ordered 92 to go straight for the big boys, and the other squadrons to engage the escort fighters, then ploughed straight on in.

My section, with [Plt Off] Harry Edwards, attacked a vic of three He 111s [from KG 54] from below, where their rear gunners couldn't reach us. We slid from one to the other, as they started to burn, then hopped over to a second vic formation and repeated the exercise from about 50 yards range. We silenced all six rear gunners and set five Heinkels on fire before running out of ammo. [Plt Off] Sammy Saunders confirmed that he saw at least three hit the deck, but I didn't stick around when their escort 109s started to get us.

Following what proved to be the final significant aerial action of *Dynamo*, the quartet of Spitfire units that engaged the German bombers and their fighter escorts between 0800 and 0830 hrs claimed 17 victories and a further 20 unconfirmed. The Luftwaffe lost six aircraft in total, five of them He 111s. Proving that German pilots were just as prone to overclaiming as their British counterparts, 17 Spitfires (and six Hurricanes) were confirmed as destroyed by the Luftwaffe fighter units involved. Seven Spitfires (and a solitary Hurricane) were in fact lost.

The action quickly tailed off after this, RAF Fighter Command's efforts in conjunction with the Royal Navy and numerous vessels of the merchant fleet allowing more than 338,000 troops to be returned to England by the time *Dynamo* ended on 4 June. RAF pilots had claimed 276 enemy aircraft destroyed during the ten-day evacuation for the loss of 96 fighters – 42 of them Spitfires. RAF Fighter Command quickly set about rebuilding its strength in anticipation of an even greater test over the coming months.

AFTERMATH

Despite the valiant efforts made by Spitfire pilots during the final stages of the Battle of France and throughout *Dynamo*, the embattled British troops at Dunkirk and the sailors manning the vessels sent to extract them from the evacuation beaches were scathing in their criticism of the RAF upon their return to England. Many of the survivors felt that RAF Fighter Command in particular had failed to adequately protect them against the might of the Luftwaffe.

In defence of his fellow fighter pilots, Gp Capt Colin Gray, who saw as much action as any man flying Spitfires in May–June 1940, explained the problems his unit (No 54 Sqn) faced during this period in his aptly named autobiography *Spitfire Patrol*:

> Patrolling Dunkirk was a pretty torrid experience for those of us who were involved. This was partly because of the long periods of 'readiness' and the intensive flying effort, but also because for the vast majority of us it was the first time we had seen a shot fired in anger and we had to learn fast. We were flying over foreign territory at the limit of our radius of action. Our patrols lasted over two hours in an aeroplane designed for a safe endurance of half that time. It did not require much imagination to envisage what would happen if we became involved in a fight towards the end of a patrol, since 'combat power' pushed up petrol consumption alarmingly – practically doubled it. We had no long-range tanks in those days, and carried only 85 gallons in our internal tanks. Normal economical cruising used about a gallon a minute, so our two-hour patrols were stretching things, and occasionally we were up for nearly two-and-a-half hours. After landing, the remaining fuel in the tanks would hardly have filled a cigarette lighter.
>
> There was a lot of ballyhoo from the Army and Navy after the event about the effectiveness, if not the actual presence, of the RAF over the beachhead: 'Where was the RAF? We never saw you', or words to that effect. One cannot altogether blame them, as it must have seemed like that to those who were being bombed or strafed by enemy aircraft, seemingly without any interference from the home side. But we were there, although those on the ground may not always have been aware of it. Much of the action took place above cloud or at some distance where they would not necessarily see us – after all, it is not much good waiting until the enemy is actually dropping his bombs. For that matter, I did not see many people on the ground either. Although close low-level support of the beachhead may have reassured the Army and Navy, it would in practice have been almost totally ineffective, as the enemy would have come and gone before we could interfere. The fact also remains that those on the ground or at sea were not particularly good at recognising friend from foe, judging from the frequency with which they let rip at us when we came within range – not that I blame them.
>
> The problem of defending the beachhead area was not helped by the fact that we had no effective early warning. No doubt the British-based radar could see something if it was up high enough, but could not see at the lower levels because radar works on 'line of sight'. Even if they could have 'seen', we could never have reacted in time from our British bases. The only option was to maintain standing

Sqn Ldrs Al Deere and Colin Gray (who would claim 47 victories between them) commanded Spitfire units in RAF Fighter Command in the autumn of 1941, in which time they relied extensively on their combat experience of the previous year. Seen here at a formal function in London, both men wear DFC and Bar ribbons on their service dress tunics. Gray also has *NEW ZEALAND* shoulder patches on his uniform. Post-war, they staunchly defended RAF Fighter Command's role in the defence of the Dunkirk evacuation. (Author's Collection)

patrols from our home bases 20 to 30 minutes' flying time away from the combat area. This allowed us about 40 minutes on patrol over the beach, but the fact that the enemy could choose the time, direction and height of his attack did not improve our chances of being in the right place at the right time. Also, standing patrols are very wasteful of flying effort and very tiring for the pilots.

To maintain a continuous patrol over the beachhead at single squadron strength for the 18 hours of daylight (4 am to 10 pm at that time of year) required the total flying effort of 27 [fighter] squadrons. Since Air Vice-Marshal Park had only 16 squadrons at his disposal, this meant we were spread pretty thinly. As a consequence, when we did engage the enemy, we were almost always heavily outnumbered. My logbook records a total of 30 hours in the air over the Boulogne/Dunkirk area in the 12 days before our withdrawal from the frontline on 28 May when the evacuation was still going strong. Towards the latter end of this period, we were flying two and sometimes three sorties a day of over two hours' duration. It was quite tiring with the added factor of combat fatigue.

Gp Capt Gray's squadronmate Air Cdre Al Deere, who was forced to crash-land on a Belgian beach in his stricken Spitfire at the height of *Dynamo*, also had his say on the RAF's performance over Dunkirk, noting in *Nine Lives*:

German bombers suffered significant casualties at the hands of RAF Fighter Command during the Luftwaffe's attempts to stop the evacuation of the BEF. Amongst the units mauled by Spitfires and Hurricanes was Do 17Z-equipped III./KG 2, to which this particular aircraft belonged. (Chris Goss Collection)

Subjected to an utterly exhausting and terrifying experience [which Deere witnessed at first-hand during his escape back to England on 28 May 1940], our soldiers and sailors returned home with a single question on their lips – 'Where was the Royal Air Force?'

In spite of any contemporary opinion to the contrary, the RAF was there. I like to think our efforts are best summed up by quoting from a review of German air force operations over Dunkirk by General of the Air Force Werner Kreipe in the book *The Fatal Decision.* Referring to the operations of III./KG 2 [which Kreipe commanded during the Battle of France], he said:

'The Wing set off next morning with its full complement of 27 aircraft to bomb Dunkirk. But before the Dorniers could unload their bombs … Spitfires, the first these German airmen had seen, hurled themselves upon the bomber Wing. Despite the heavy defensive fire of the German air gunners, the British attacked again and again, and succeeded in driving the Dorniers away from their target. As soon as the Wing landed, it received orders to take off again. The moment the Dorniers appeared, the tireless British fighters attacked. But on this occasion there was German fighter support, and though the British forced home their attacks time and time again, the German bombers managed to get through to their targets. Our losses were not inconsiderable.

'Thus, on this one day, out of 27 aeroplanes in one Wing, 11 were put out of action. The days of easy victory were over. We had met the Royal Air Force head-on.'

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Front Cover Artwork: At 1830 hrs on 23 May 1940, No 92 Sqn, undertaking its second patrol of the day, attempted to attack 15–20 enemy bombers targeting Allied shipping in Boulogne harbour. However, approximately 30 Bf 110s of I./ZG 26 and II./ZG 76 intervened, attacking the Spitfires from above – with devastating results. In the ensuing engagement, the squadron had three aircraft shot down and three more badly damaged. In return, the unit claimed seven Bf 110s destroyed and six unconfirmed destroyed, although not a single *Zerstörer* was in fact lost – three returned to base damaged but repairable. Amongst those to make claims was Flt Lt Bob Tuck in N3249, the future high-scoring ace being credited with one Bf 110 destroyed and a second unconfirmed destroyed.

Title Page: Armourers from No 602 Sqn have removed the access panels from two of the port wing's four gun bays in order to cock the 0.303-in. weapons housed within them at Drem in March 1940. The Spitfire I, which shows significant signs of wear on the wing root, has a large diamond-shaped gas detection patch directly below the inner gun bay. No 602 Sqn pilots were in the thick of the action during the Phoney War, making eight claims between 16 October 1939 and 22 February 1940. (Author's Collection)

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